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I. Pre-Requisites

A. Commissioner's Resolution

B. Special Thanks and Acknowledgements

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Yellowstone County Board of Commissioners

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Geographic Information Systems (GIS) Maps:

Yellowstone County GIS developed some of the maps included in this plan and assisted with data collection. The contributions from this department were essential in illustrating the extent and potential losses associated with the natural hazards affecting the County.

Annette Cabrera, GIS

Janelle Luppen

The information on the maps in this plan were derived from Yellowstone County's GIS, Weather Service and NOAA. Care was taken in the creation of these maps, but is provided "as is." Yellowstone County cannot accept any responsibility for any errors, omissions or positional accuracy, and therefore, there are no warranties that accompany these products (the maps). Although information from land surveys may have been used in the creation of these products, in no way does this product represent or constitute a land survey. Users are cautioned to field verify information on this product before making any decisions.

Montana Bureau of Mines and Geology, a department of Montana Tech of The University of Montana provided hazard study maps of the Yellowstone County region.

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C. Preface

Located in south central Montana, Yellowstone County is Montana's most populous county with 129,352 residents, according to the 2000 Census.

Billings, the county seat, is the state's largest city with a population of 89,847 and is a major retail and wholesale trade, financial, energy, transportation and medical center. The annual growth rate of Billings is approximately 13%. According to the *Montana Almanac*, by authors Andrea Merrill and Judy Jacobson, the county was established in 1883 from a part of Custer County & parts of it were taken to form Carbon, Sweet Grass, Musselshell, Big Horn and Stillwater Counties. In 1919 and in 1925, Yellowstone and Carbon Counties annexed parts of each other.

Yellowstone County derives its names from the Yellowstone River, which is an English translation of the name that the French trappers used for it, "Roche Jaune." Captain William Clark originally called Pompeys Pillar, an area landmark, Pompey's Tower. The authors add he named it after Sacajawea's son Baptiste, whom he called "Little Pomp." And Billings was named for lawyer, philanthropist and former Northern Pacific Railroad President Frederick Billings. The Yellowstone River is designated as a "Wild and Scenic" River and flows freely without damming for 600 miles.

According to the U.S. Bureau of the Census, median income for Yellowstone County households in 1989 was \$25,942. The county is 2,666 square miles in area, 2,635 square miles in land area and 31 square miles in inland water area. There are 24 public and privately owned dams within the county boundaries. The communities, towns and cities that make up Yellowstone County are Acton, Ballantine, Billings, Broadview, Custer, Huntley, Laurel, Pompeys Pillar, Shepherd and Worden. A portion of the Crow Indian Reservation lies within the boundaries of Yellowstone County.

County residents experience the four distinct seasons. According to the Montana Almanac, the average daily low in January between 1980 and 1989 was 13.3 degrees above zero and average January snowfall 9.3 inches. The average daily high in July was 87.0 degrees. The annual precipitation in 1995 was 16.73 inches and the length of the growing season 131 days.

D. Executive Summary

Local Mitigation Plan requirements in §201.6 of the Interim Final Rule apply to both local jurisdictions and Indian tribal governments. The local mitigation planning requirements encourage agencies at all levels, local residents, businesses, and the non-profit sector to participate in the mitigation planning and implementation process. With broader public and private sector participation in the development of mitigation measures and the implementation of these activities, will lead to identifying more local funding that would not necessarily been considered for mitigation activities.

Yellowstone County chose to complete a comprehensive plan by addressing both natural and manmade disasters. This multi-hazard plan will better prepare Yellowstone County in the event of such disasters.

Action Plan

The Yellowstone County Pre-Disaster Mitigation Plan includes resources and information to assist county residents, public and private sector organizations, and other interested in participating in planning for hazards. The mitigation plan provides a list of activities that may assist Yellowstone County in reducing risk and preventing loss from future natural hazard events. The action items address multi-hazard issues, as well as activities for flood, landslide, severe winter storms, severe summer storms, windstorms, wildfire, earthquake, and volcanic eruption hazards.

Plan Development

The Pre-Disaster Mitigation Plan contains an action plan, background on the purpose and methodology used to develop the mitigation plan, a profile of Yellowstone County, sections on each hazard that occurs within the County, and several appendices.

Plan Development Participation

Yellowstone County Pre-Disaster Mitigation Plan is the result of a collaborative effort between Yellowstone County citizens, public agencies, non-profit organizations, the private sector, and regional and state organizations. Public participation played a key role in development of goals and action items. Interviews were conducted with stakeholders across the County, and public workshops were held to include Yellowstone County residents in plan development. A project Steering Committee guided the process of developing the plan. The Steering Committee was comprised of representatives from the Local Emergency Planning Committee including these agencies:

911 Center
American Medical Response
American Red Cross
Big Sky Economic Development Authority
Billings Fire Department
Billings Police Department
Brenntag West, Inc.
Dixe Petro Chem

Burlington Northern Sante Fe Railroad
Cenex Refinery
City of Billings
City of Laurel
Conoco/Phillips Refinery
Cooper Creative
Deaconess Billings Clinic
ExxonMobil

FBI
Laurel Fire Department
Lockwood Fire Department
Logan Airport
MetraPark
Montana Dakota Utilities
Montana District V DES
Montana Highway Patrol
Montana Rail Link
Montana Safety Services
Montana SERC
Montana State University-Billings
Montana Sulphur and Chemical
National Weather Service
Northern Rockies Cancer Center
Public Utilities
Safety Master

Saint Vincent Healthcare
School District #2
City of Billings Solid Waste
United Agri Products
United Parcel Service
United States Postal Service
United Way Volunteer Center
Yellowstone Amateur Radio Emergency
Service
Yellowstone City/County Health Dept.
Yellowstone County DES
Yellowstone County Environmental Health
Yellowstone Co. Parks, Rec., Public Lands
Yellowstone County Planning Department
Yellowstone County Project Impact/PDM
Yellowstone County Rural Fire Council
Yellowstone County Sheriffs Office

Plan Mission

The mission of the Yellowstone County Pre-Disaster Mitigation Plan is to promote sound public policy designed to protect citizens, critical facilities, infrastructure, private property, and the environment from hazards. This can be achieved by increasing public awareness, documenting the resources for risk reduction and loss-prevention, and identifying activities to guide Yellowstone County towards building a safer, more sustainable community.

Plan Goals

The Plan goals describe the overall direction that Yellowstone County agencies, organizations, and citizens will take to work toward mitigating risk from hazards. The goals are stepping-stones between the broad direction of the mission statement and the specific recommendations outlined in the action items.

Protection of Life and Property

Implement activities that assist in protecting lives by making homes, businesses, infrastructure, critical facilities, and other property more resistant to losses from hazards. Reduce losses and repetitive damages for chronic hazard events while promoting insurance coverage for catastrophic hazards. Improve hazard assessment information to make recommendations for discouraging new development and encouraging preventative measures for existing development in areas vulnerable to hazards.

Public Awareness

Develop and implement education and outreach programs to increase public awareness of the risks associated with hazards. Provide information on tools, partnerships opportunities, and funding resources to assist in implementing mitigation activities.

Natural Systems

Balance watershed planning, natural resource management, and land use planning with hazard mitigation to protect life, property, and the environment. Preserve, rehabilitate, and enhance natural systems to serve hazard mitigation functions.

Partnerships and Implementation

Strengthen communication and coordinate participation among and within public agencies, citizens, non-profit organizations, business, and industry to gain a vested interest in implementation. Encourage leadership within public and private sector organizations to prioritize and implement local, county, and regional hazard mitigation activities.

Emergency Services

Establish policy to ensure mitigation projects for critical facilities, services, and infrastructure. Strengthen emergency operations by increasing collaboration and coordination among public agencies, non-profit organizations, business and industry. Coordinate and integrate hazard mitigation activities, where appropriate, with emergency operations plans and procedures.

Action Items

The **action items** are a listing of activities in which county agencies and citizens can be engaged to reduce risk. Each action item includes an estimate of the timeline for implementation. **Short-term action items** are activities that county agencies may implement with existing resources and authorities within one to two years. **Long-Term action items** may require new or additional resources or authorities, and may take between one to five years to implement.

The action items are organized within the following matrix, which lists all of the multi-hazard and hazard specific action items included in the mitigation plan. Data collection, research and the public participation process resulted in the development of these action items. The matrix includes the following information on each action item:

Coordinating Organization: The coordinating organization is the public agency with regulatory responsibility to address natural hazards, or that is willing and able to organize resources, find appropriate funding, or oversee activity implementation, monitoring, and evaluation. Coordinating organizations may include local, county, or regional agencies that are capable of or responsible for implementing activities and programs.

Timeline: Action items include both short and long-term activities. Each action item includes an estimate of the timeline for implementation. Short-term action items are activities which county agencies are capable of implementing with existing resources and authorities within one to two years. Long-term actions items may require new or additional resources or authorities, and may take between one and five years to implement.

Ideas for Implementation: Each action item includes ideas for implementation and potential resources, which may include grant programs or human resources.

Plan Goals Addressed: The plan goals addressed by each action item are included as a way to monitor and evaluate how well the mitigation plan is achieving its goals once implementation begins. The plan goals are organized into the following four areas:

- (1) Protect Life and Property
- (2) Public Awareness
- (3) Natural Systems
- (4) Partnerships and Implementation
- (5) Emergency Services

Implementation, Oversight, and Evaluation

The Plan Maintenance Section of this document details the formal process that will ensure that the Yellowstone County All Hazards Mitigation Plan remains an active and relevant document. The plan maintenance process includes a schedule for monitoring and evaluating the Plan annually and producing a plan revision every five years. This section describes how the county will integrate public participation throughout the plan maintenance process. Finally, this section includes an explanation of how Yellowstone County government intends to incorporate the mitigation strategies outlined in this Plan into existing planning mechanisms such as the County Comprehensive Land Use Plan, Capital Improvement Plans, and Building Codes.

Plan Adoption

The Board of County Commissioners (BOCC) will be responsible for adopting the Yellowstone County Pre-Disaster Mitigation Plan. This governing body has the authority to promote sound public policy regarding hazards. Once the Plan has been adopted, the County Disaster and Emergency Services Director will be responsible for submitting it to the State Hazard Mitigation Officer for review. This review will address the federal criteria outlined in FEMA Interim Final Rule 44 CFR Part 201. Upon acceptance by FEMA, Yellowstone County will gain eligibility for Hazard Mitigation Grant Program funds.

Coordinating Body

A Yellowstone County Pre-Disaster Mitigation Committee (PDM Committee) and the Local Emergency Planning Committee (LEPC) will be responsible for coordinating implementation of Plan action items and undertaking the formal review process. The PDM Committee consists of members from the LEPC.

The PDM Committee will meet no less than twice a year. These meetings will provide an opportunity to discuss the progress of the action items and maintain the partnerships that are essential for the sustainability of the mitigation plan.

Convener

The Board of County Commissioners will adopt the Yellowstone County Pre-Disaster Mitigation Plan, and the PDM Committee will take responsibility for plan implementation

under the direction of Director of Disaster and Emergency Services. This County representative will serve as convener to facilitate the PDM Committee meeting, and will assign tasks such as updating and presenting the plan to the members of the committee. Plan implementation and evaluation will be a shared responsibility among all of the PDM Committee members.

Implementation through Existing Programs

Yellowstone County addresses statewide planning goals and legislative requirements through its Comprehensive Land Use Plan, Capital Improvement Plans, and Montana Building Codes. The Pre-Disaster Mitigation Plan provides a series of recommendations that are closely related to the goals and objectives of these existing planning programs. Yellowstone County will have the opportunity to implement recommended mitigation action items through existing programs and procedures. Upon adoption of the Pre-Disaster Mitigation Plan it will be used as the baseline of information on the hazards that impact the county.

Economic Analysis of Mitigation Projects

The Federal Emergency Management Agency's approach to identify costs and benefits associated with hazard mitigation strategies or projects fall into two general categories: benefit/cost analysis and cost-effectiveness analysis. Conducting benefit/cost analysis for a mitigation activity can assist communities in determining whether a project is worth undertaking now, in order to avoid disaster related damages later. Cost effectiveness analysis evaluates how best to spend a given amount of money to achieve a specific goal. Determining the economic feasibility of mitigating hazards can provide decision makers with an understanding of the potential benefits and cost of an activity, as well as a basis upon which to compare alternative projects.

Formal Review Process

The Yellowstone County Pre-Disaster Mitigation Plan will be reviewed and evaluated on an annual basis to determine the effectiveness of programs, and to reflect changes in land development or programs that may affect mitigation priorities. The evaluation process includes a firm schedule and timeline, and identifies the local agencies and organization participating in the plan evaluation. The convener will be responsible for contacting the PDM Committee members and organizing the annual meeting. Committee members will be responsible for monitoring and evaluating the process of the mitigation strategies in the Plan.

Continued Public Involvement

Yellowstone County is dedicated to involving the public directly in the continual review and updates of the Pre-Disaster Mitigation Plan. Copies of the plan will be catalogued and kept at the Billings Public Library, the Yellowstone County Clerk and Records Office, and the Yellowstone Disaster and Emergency Services Office. The plan will also include the address, email address, and phone number of Yellowstone County DES which will be responsible for keeping track of public comments on the plan. In addition, copies of the Plan and any proposed changes will be posted on the County website. This site will also contain an email address and phone number to which people can direct their comments and concerns.

E. Introduction

Yellowstone County is confronted daily with the possibility of a serious incident of emergency proportions. Natural, technological, and man-made hazards pose a constant threat to the health, welfare, and security of our citizens. The cost of response to and recovery from disasters is so high and life is so precious that attention must turn to mitigating their effects/impacts before they occur or re-occur.

Historically, mitigation activities have been the most neglected programs within emergency management. Since the priority to implement mitigation activities is generally low in comparison to the perceived threat, some important mitigation measures take time to implement. Mitigation success can be achieved, however, if accurate information is portrayed through complete hazard identification and impact studies, followed by effective mitigation salesmanship and strong governmental leadership.

All government leaders must recognize that it is possible to break the cycle of recurring damage and loss. They are responsible for developing and maintaining a high level of preparedness for all hazards, which include response and recovery plans, training, development, management of resources, and the need to mitigate each hazard their jurisdiction can experience. The Pre-Disaster Mitigation Plan attempts to address each of the identified hazards specific to Yellowstone County.

The Yellowstone County Pre-Disaster Mitigation Plan represents a coordinated effort and ongoing commitment to mitigate potential losses and damages caused by the hazards that can be experienced in our County. The Plan consists of basic Hazard Mitigation Planning and Pre-Disaster Mitigation Planning for each identified hazard. County agencies with an emergency assignment in the County Emergency Operations Plan have general responsibility for mitigation planning and implementation.

The plan identifies opportunities and suggestive actions, which could reduce the impact of future disasters or emergencies. The intricate implementation process can only be accomplished and coordinated by sincere, dedicated individuals and political entities responsible for all hazards preparedness or emergency management.

F. Purpose

To fulfill federal, state and local hazard mitigation planning responsibilities; to recognize and describe potential hazards and impact upon the county; develop programs, activities, strategies, and recommendations for mitigation; to monitor and promote pre and post disaster mitigation measures, short/long range strategies that minimize suffering, loss of life, and damage to property resulting from hazardous or potentially hazardous conditions to which citizens and institutions within Yellowstone County are exposed; and to eliminate or minimize conditions which would have an undesirable impact on our citizens, the economy, environment, and well-being Yellowstone County.

G. Scope

The scope of the Yellowstone County Pre-Disaster Mitigation Plan is countywide including incorporated cities. The Plan is not necessarily limited to Federal, State, or locally declared disasters or emergencies. Anytime local situations and incidents produce a requirement for mitigation actions, activities, and strategies, etc. they will be developed and incorporated into the Pre-Disaster Mitigation Plan. This plan does not intend to replace existing preparedness and operational documents. Instead, it provides mitigation strategies, goals, objectives and priorities, which can serve to strengthen and improve the effectiveness of local operational procedures.

H. Authority

Federal: Public Law 93-288 as amended, established the basis for federal hazard mitigation activity in 1974. A section of this Act requires the identification, evaluation, and mitigation of hazards as a prerequisite for state receipt of future disaster assistance outlays. Since 1974, many additional programs, regulations, and laws have expanded on the original legislation to establish hazard mitigation as a priority at all levels of government. When PL 93-288 was amended by the Stafford Act, several additional provisions were also added that provide for the availability of significant mitigation measures in the aftermath of Presidentially declared disasters. Civil Preparedness Guide 1-3, Chapter 6 – Hazard Mitigation Assistance Programs places emphasis on hazard mitigation planning directed toward hazards with a high impact and threat potential.

Legislative: The Disaster Mitigation Act (DMA) of 2000 amends Robert T. Stafford Disaster relief and emergency assistance act by adding a new section, 322---Mitigation Planning. It requires all local governments to have an approved Pre-Disaster Mitigation Plan in place to be eligible to receive Hazard Mitigation Grant Program project funding.

Executive: The Governor has the leadership role in the issuance of guidance to all state agencies to minimize the effects of hazards on the citizens of Montana. In state and federal recovery agreements following a Presidentially declared disaster, the Governor initiates updating of the state and local mitigation plans based on federal requirements or state and local needs. State DES administers mitigation guidance and funding to state and local applicants following a Presidentially declared disaster.

Local: Local governments play an essential role in implementing effective mitigation, both before and after disaster events. Local government will review all damages, losses, and related impacts to determine the need or requirement for mitigation action and planning whenever seriously effected by disaster, or when applying for state or federal recovery assistance. The Yellowstone County Board of County Commissioners and their appointees will be responsible for carrying out plans and policies related to the Pre-Disaster Mitigation Plan. Local government must be prepared to participate in the post -disaster Hazard Mitigation Team process and the pre-mitigation planning as outlined in this document.

I. Goals and Objectives

The goals and objectives of this plan are to create a disaster resistant county by reducing the threat of hazards to life, property, emergency response capabilities, economic stability, and infrastructure while encouraging the protection and restoration of natural resources and the environment. A sound planning process is essential to the development of an effective mitigation plan. The Plan goals describe the overall direction that Yellowstone County agencies, organizations, and citizens will take to work toward mitigating risk from hazards.

Protection of Life and Property

Implement activities that assist in protecting lives by making homes, businesses, infrastructure, critical facilities, and other property more resistant to losses from hazards. Reduce losses and repetitive damages for chronic hazard events while promoting insurance coverage for catastrophic hazards. Improve hazard assessment information to make recommendations for discouraging new development and encouraging preventative measures for existing development in areas vulnerable to hazards.

Public Awareness

Develop and implement education and outreach programs to increase public awareness of the risks associated with hazards. Provide information on tools, partnerships opportunities, and funding resources to assist in implementing mitigation activities.

Natural Systems

Balance watershed planning, natural resource management, and land use planning with hazard mitigation to protect life, property, and the environment. Preserve, rehabilitate, and enhance natural systems to serve hazard mitigation functions.

Partnerships and Implementation

Strengthen communication and coordinate participation among and within public agencies, citizens, non-profit organizations, business, and industry to gain a vested interest in implementation. Encourage leadership within public and private sector organizations to prioritize and implement local, county, and regional hazard mitigation activities.

Emergency Services

Establish policy to ensure mitigation projects for critical facilities, services, and infrastructure. Strengthen emergency operations by increasing collaboration and coordination among public agencies, non-profit organizations, business and industry. Coordinate and integrate hazard mitigation activities, where appropriate, with emergency operations plans and procedures.

J. Definition of Terms

Acceleration	The rate of change of velocity with respect to time. Acceleration due to gravity at the earth's surface is 9.8 meters per second squared. That means that every second that something falls toward the surface of earth its velocity increases by 9.8 meters per second.
Asset	Any manmade or natural feature that has value, including, but not limited to people; buildings; infrastructure like bridges, roads, and sewer and water systems; lifelines like electricity and communication resources; or environmental, cultural, or recreational features like parks, dunes, wetlands, or landmarks.
Base Flood	Flood that has a 1 percent probability of being equaled or exceeded in any given year. Also known as, the 100-year flood.
Base Flood Elevation (BFE)	Elevation of the base flood in relation to a specified datum, such as the National Geodetic Vertical Datum of 1929. The Base Flood Elevation is used as the standard for the National Flood Insurance Program.
Bedrock	The solid rock that underlies loose material, such as soil, sand, clay, or gravel.
Bio-Terrorism	Intentional, criminal, malicious acts using biological agents to cause harm to large numbers of people.
Building	A structure that is walled and roofed, principally above ground and permanently affixed to a site. The term includes a manufactured home on a permanent foundation on which the wheels and axles carry no weight.
Community Rating System	An NFIP program that provides incentives for NFIP communities to complete activities that reduce flood hazard risk. When the community completes specified activities, the insurance premiums of policyholders in these communities are reduced.
Computer-Aided Design And Drafting (CADD)	A computerized system enabling quick and accurate electronic 2-D and 3-D Drafting (CADD) drawings, topographic mapping, site plans, and profile/cross-section drawings.
Contour	A line of equal ground elevation on a topographic (contour) map.

Critical Facility	Facilities that are critical to the health and welfare of the population and that are especially important following hazard events. Critical facilities include, but are not limited to, shelters, police and fire stations, and hospitals.
Debris	The scattered remains of assets broken or destroyed in a hazard event. Debris caused by a wind or water hazard event can cause additional damage to other assets.
Digitize	To convert electronically points, lines, and area boundaries shown on maps into x, y coordinates (e.g., latitude and longitude, universal transverse mercator (UTM), or table ordinates) for use in computer applications.
Displacement Time	The average time (in days) which the building's occupants typically must operate from a temporary location while repairs are made to the original building due to damages resulting from a hazard event.
Duration	How long a hazard event lasts.
Earthquake	A sudden motion or trembling that is caused by a release of strain accumulated within or along the edge of earth's tectonic plates.
Erosion	Wearing away of the land surface by detachment and movement of soil and rock fragments, during a flood or storm or over a period of years, through the action of wind, water, or other geologic processes.
Erosion Hazard Area	Area anticipated to be lost to shoreline retreat over a given period of time. The projected inland extent of the area is measured by multiplying the average annual long-term recession rate by the number of years desired.
Essential Facility	Elements that are important to ensure a full recovery of a community or state following a hazard event. These would include; government functions, major employers, banks, schools, and certain commercial establishments, such as grocery stores, hardware stores, and gas stations.
Extent	The size of an area affected by a hazard or hazard event.
Fault	A fracture in the continuity of a rock formation caused by a shifting or dislodging of the earth's crust, in which adjacent surfaces are differentially displaced parallel to the plane of fracture.

Federal Emergency Management Agency (FEMA)	Independent agency created in 1978 to provide a single point of accountability for all Federal activities related to disaster mitigation and emergency preparedness, response and recovery. This agency is now included with the office of Homeland Security as of 2003.
Fire Potential Index (FPI)	Developed by USGS and USFS to assess and map fire hazard potential over broad areas. Based on such geographic information, national policy makers and on-the-ground fire managers established priorities for prevention activities in the defined area to reduce the risk of managed and wildfire ignition and spread. Prediction of fire hazard shortens the time between fire ignition and initial attack by enabling fire managers to pre-allocate and stage suppression forces to high fire risk areas.
Flash Flood	A flood event occurring with little or no warning where water levels rise at an extremely fast rate.
Flood	A general and temporary condition of partial or complete inundation of normally dry land areas from (1) the overflow of inland or tidal waters, (2) the unusual and rapid accumulation or runoff of surface waters from any source, or (3) mudflows or the sudden collapse of shoreline land.
Flood Depth	Height of the floodwater surface above the ground surface.
Flood Elevation	Elevation of the water surface above an established datum, e.g. National Geodetic Vertical Datum of 1929, North American Vertical Datum of 1988, or Mean Sea Level.
Flood Hazard Area	The area shown to be inundated by a flood of a given magnitude on a map.
Flood Insurance Rate Map (FIRM)	Map of a community, prepared by the Federal Emergency Management Agency, that shows both the special flood hazard areas and the risk premium zones applicable to the community.
Flood Insurance Study (FIS)	A study that provides an examination, evaluation, and determination of flood hazards and, if appropriate, corresponding water surface elevations in a community or communities.
Floodplain	Any land area, including watercourse, susceptible to partial or complete inundation by water from any source.

Frequency	A measure of how often events of a particular magnitude are expected to occur. Frequency describes how often a hazard of a specific magnitude, duration, and/or extent typically occurs, on average. Statistically, a hazard with a 100-year recurrence interval is expected to occur once every 100 years on average, and would have a 1 percent chance – its probability – of happening in any given year. The reliability of this information varies depending on the kind of hazard being considered.
Fujita Scale of Tornado Intensity	Rates tornadoes with numeric values from F0 to F5 based on tornado wind speed and damage sustained. An F0 indicates minimal damage such as broken tree limbs or signs, while an F5 indicates severe damage sustained.
Functional Downtime	The average time (in days) during which a function (business or service) is unable to provide its services due to a hazard event.
Geographic Area Impacted	The physical area in which the effects of the hazard are experienced.
Geographic Information Systems (GIS)	A computer software application that relates physical features on earth to a database to be used for mapping and analysis.
Ground Motion	The vibration or shaking of the ground during an earthquake. When a fault ruptures, seismic waves radiate, causing the ground to vibrate. The severity of the vibration increases with the amount of energy released and decreases with distance from the causative fault or epicenter, but soft soils can further amplify ground motions.
Hazard	A source of potential danger or adverse condition. Hazards in this how-to series will include naturally occurring events such as floods, earthquakes, tornadoes, tsunamis, coastal storms, landslides, and wildfires that strike populated areas. A natural event is a hazard when it has the potential to harm people or property.
Hazard Event	A specific occurrence of a particular type of hazard.
Hazard Identification	The process of identifying hazards that threaten an area.
Hazard Mitigation	Sustained actions taken to reduce or eliminate long-term risk from hazards and their effects.

Hazard Profile	A description of the physical characteristics of hazards and a determination of various descriptors including magnitude, duration, frequency, probability, and extent. In most cases, a community can most easily use these descriptors when they are recorded and displayed as maps.
HAZUS (Hazards U.S.)	A GIS-based nationally standardized earthquake loss estimation tool developed by FEMA.
Hydrology	The science of dealing with the waters of the earth. A flood discharge is developed by a hydrologic study.
Infrastructure	Refers to the public services of a community that have a direct impact on the quality of life. Infrastructure includes communication technology such as phone lines or Internet access, vital services such as public water supplies and sewer treatment facilities, and includes an area's transportation system such as airports, heliports; highways, bridges, tunnels, roadbeds, overpasses, railways, bridges, rail yards, depots; and waterways, canals, locks, seaports, ferries, harbors, drydocks, piers and regional dams.
Intensity	A measure of the effects of a hazard event at a particular place.
Landslide	Downward movement of a slope and materials under the force of gravity.
Lowest Floor	Under the NFIP, the lowest floor of the lowest enclosed area (including basement) of a structure.
Magnitude	A measure of the strength of a hazard event. The magnitude (also referred to as severity) of a given hazard event is usually determined using technical measures specific to the hazard.
Mitigate	To cause to become less harsh or hostile; to make less severe.
Mitigation Plan	A systematic evaluation of the nature and extent of vulnerability to the effects of natural hazards typically present in the state and includes a description of actions to minimize future vulnerability to hazards.
National Flood Insurance Program (NFIP)	Federal program created by Congress in 1968 that makes flood insurance available in communities that enact minimum flood plain management regulations in 44 CFR §60.3.

National Geodetic Vertical Datum of 1929. (NGVD)	Datum established in 1929 and used in the NFIP as a basis for measuring flood, ground, and structural elevations, previously referred to as Sea Level Datum or Mean Sea Level. The Base Flood Elevations shown on most of the Flood Insurance Rate Maps issued by the Federal Emergency Management Agency are referenced to NGVD.
National Weather Service (NWS)	Prepares and issues flood, severe weather, and coastal storm warnings and can provide technical assistance to Federal and state entities in preparing weather and flood warning plans.
Planimetric	Describes maps that indicate only man-made features like buildings.
Planning	The act or process of making or carrying out plans; the establishment of goals, policies and procedures for a social or economic unit.
Probability	A statistical measure of the likelihood that a hazard event will occur.
Recurrence Interval	The time between hazard events of similar size in a given location. It is based on the probability that the given event will be equaled or exceeded in any given year.
Repetitive Loss Property	A property that is currently insured for which two or more National Flood Insurance Program losses (occurring more than ten days apart) of at least \$1000 each have been paid within any 10-year period since 1978.
Replacement Value	The cost of rebuilding a structure. This is usually expressed in terms of cost per square foot, and reflects the present-day cost of labor and materials to construct a building of a particular size, type and quality.
Richter Scale	A numerical scale of earthquake magnitude devised by seismologist C.F. Richter in 1935.
Risk	The possibility of loss or injury. The estimated impact that a hazard would have on people, services, facilities, and structures in a community; the likelihood of a hazard event resulting in an adverse condition that causes injury or damage. Risk is often expressed in relative terms such as a high, moderate or low likelihood of sustaining damage above a particular threshold due to a specific type of hazard event. It also can be expressed in terms of potential monetary losses associated with the intensity of the hazard.
Riverine	Of or produced by a river.

Scale	A proportion used in determining a dimensional relationship; the ratio of the distance between two points on a map and the actual distance between the two points on the earth's surface.
Scarp	A steep slope.
Scour	Removal of soil or fill material by the flow of flood waters. The term is frequently used to describe storm-induced, localized conical erosion around pilings and other foundation supports where the obstruction of flow increases turbulence.
Seismicity	Describes the likelihood of an area being subject to earthquakes.
Special Flood Hazard Area (SFHA)	An area within a floodplain having a 1 percent or greater chance of flood occurrence in any given year (100-year floodplain); represented on Flood Insurance Rate Maps by darkly shaded areas with zone designations that include the letter A or V.
Stafford Act	The Robert T. Stafford Disaster Relief and Emergency Assistance Act, PL 100-107 was signed into law November 23, 1988 and amended the Disaster Relief Act of 1974, PL 93-288. The Stafford Act is the statutory authority for most Federal disaster response activities, especially as they pertain to FEMA and its programs.
State Hazard Mitigation Officer (SHMO)	The representative of state government who is the primary point of contact with FEMA, other state and Federal agencies, and local units of government in the planning and implementation of pre- and post-disaster mitigation activities.
Structure	Something constructed. (See also Building)
Substantial Damage Hazard	Damage of any origin sustained by a structure in a Special Flood Area whereby the cost of restoring the structure to its before-damaged condition would equal or exceed 50 percent of the market value of the structure before the damage.
Surface Faulting	The differential movement of two sides of a fracture – in other words, the location where the ground breaks apart. The length, width, and displacement of the ground characterize surface faults.
Tectonic Plate	Torsionally rigid, thin segments of the earth's lithosphere that may be assumed to move horizontally and adjoin other plates. It is the friction between plate boundaries that cause seismic activity.
Technological Hazards	Incidents that can arise from human activities such as the manufacture, transportation, storage, and use of hazardous materials.

Terrorism	Intentional, criminal, malicious acts including biological, chemical, nuclear, and radiological weapons, arson, incendiary, explosive, and armed attacks, industrial sabotage and intentional hazardous materials releases.
Topographic	Characterizes maps that show natural features and indicate the physical shape of the land using contour lines. These maps may also include manmade features.
Tornado	A violently rotating column of air extending from a thunderstorm to the ground.
Vulnerability	Describes how exposed or susceptible to damage an asset is. Vulnerability depends on an asset's construction, contents, and the economic value of its functions. Like indirect damages, the vulnerability of one element of the community is often related to the vulnerability of another. For example, many businesses depend on uninterrupted electrical power – if an electric substation is flooded, it will affect not only the substation itself, but a number of businesses as well. Often, indirect effects can be much more widespread and damaging than direct ones.
Vulnerability Assessment	The extend of injury and damage that may result from a hazard event of a given intensity in a given area. The vulnerability assessment should address impacts of hazard events on the existing and future build environment.
Wildfire	An uncontrolled fire spreading through vegetative fuels, exposing and possibly consuming structures.
Zone	A geographical area shown on a Flood Insurance Rate Map (FIRM) that reflects the severity or type of flooding in the area.

K. Acronyms

BOCC	Board Of County Commissioners
COE	U.S. Army Corps of Engineers
CRP	Conservation Reserve Program
DES	Disaster and Emergency Services
DMA	Disaster Mitigation Act
DNRC	Montana Department of Natural Resources and Conservation
DOI	U.S. Department of the Interior
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
GIS	Geographic Information Systems
HUD	U.S. Department of Housing and Urban Development
LEPC	Local Emergency Planning Committee
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resource Conservation Service
NWS	National Weather Service
MTDES	Montana Disaster and Emergency Services
PDM	Pre-Disaster Mitigation
RFC	River Forecast Center
USFS	U.S. Forest Service
USGS	U.S. Geological Survey

II. Planning Process

To be successful the planning must include the support of public officials, agency personnel, business owners and operators, citizens, and other community members. The planning process used by Yellowstone County consisted of holding public meetings to identify hazards throughout the County as required by §201.4(b) and §201.4(c) of the Disaster Mitigation Act of 2000. These meetings were publicized through local newspaper, radio, television, and on the Yellowstone County web site to encourage participation. Each participant was asked to identify hazards known to them and provide any information they had on previous events that occurred for each particular hazard. All participants were asked to continue the process if interested by attending additional meetings to participate in risk assessment. Community members who were not able to attend public meetings were invited to mail or email their thoughts, suggestions, and comments to James Kraft, Yellowstone County Disaster and Emergency Services, or Dianne Lehm at Big Sky Economic Development Authority. These opportunities allowed open public comment on the plan at all stages of formation, and the involvement of communities, interested agencies, and private and non-profit organizations.

A. Documentation of Planning Process

Pre-Disaster Mitigation Planning is continuous. The stages of planning operate concurrently. At any given time, planning to plan, risk analysis, updating the situation assessment, research, coordinating, disaster response or other activity is occurring. Defining the process will provide a clearer guide to successful planning.

The planning process consisted of a core team of individuals working on development of the plan. The core team included local, State, and federal agency representatives, as well as community representatives, local business leaders, and educators. In addition to the core team preparing the plan, residents, businesses, and other interested parties were kept apprized of the progress through open public meetings and the Yellowstone County Pre-Disaster Mitigation website.

Public Comment---The public was invited to comment on the Pre-Disaster Mitigation Plan process at each open Local Emergency Planning Committee (LEPC) meeting and Pre-Disaster Mitigation Planning Committee meetings. These meetings were publicized in the local newspapers and on the Yellowstone County website. All of these meetings were open to the public.

Local and Regional Agencies---Both local and regional agencies were involved at all stages of the planning process. The Local Emergency Planning Committee (LEPC) has representatives serving from all across Yellowstone County.

Review, Studies, Reports---All current mitigation plans were reviewed and the Local Emergency Planning Committee was involved in the process of developing the overall Pre-Disaster Mitigation Plan. Members of the Local Emergency Planning Committee (LEPC) met at least once a month for work sessions on the Pre-Disaster Mitigation Plan and to discuss current situations and planning activities within Yellowstone County. A list of LEPC members is provided in the Appendix.

January 14, 2003 LEPC 22 attendees *See appendix for minutes of meeting.*

LEPC members and the public were kept up to date and involved in the process from submitting the application, checking on the application process, to receiving the award letter. During this time members were diligent in monitoring the progress of the application and in their efforts to identify areas of concern in the County.

February 11, 2003 LEPC *See appendix for minutes of meeting.*

LEPC members and the public were kept up to date and involved in the process from submitting the application, checking on the application process, to receiving the award letter. During this time members were diligent in monitoring the progress of the application and in their efforts to identify areas of concern in the County.

March 11, 2003 LEPC 25 attendees *See appendix for minutes of meeting.*

The LEPC held its regularly scheduled meeting and addressed the current situations facing the County as a whole and by each member's area of expertise. The planning process for the Pre-Disaster Mitigation Plan was discussed and the first full planning session began following the regular meeting.

March 11, 2003 Community Planning Session *See appendix.*
32 attendees

The first Community Planning Session consisted of 32 individuals from the LEPC and the public. The first thing accomplished was identifying all potential risks to Yellowstone County, both natural and manmade. At the end of the two-hour planning session over 30 possible types of hazards were identified. Upon review of these hazards some items were grouped together to eliminate duplication.

April 8, 2003 LEPC 31 attendees *See appendix for minutes of meeting.*

The LEPC held its regularly scheduled meeting and addressed the current situations facing the County as a whole and by each member's area of expertise. The planning success of the first planning session was discussed and the second full planning session began following the regular meeting. Members of the LEPC that were not able to stay and attend the planning session took a copy of the planning session handout to complete and return at the next meeting.

April 8, 2003 Community Planning Session *See appendix.*
6 attendees

Each attendee received a handout of the results of the previous meeting and a worksheet to identify the specific areas each disaster has occurred in the past or is likely to occur in the future. Most attendees requested more time to thoroughly complete the task. Most took the handout with them to complete and return at the next meeting.

May 13, 2003 LEPC 30 attendees *See appendix for minutes of meeting.*

The LEPC held its regularly scheduled meeting and addressed the current situations facing the County as a whole and by each member's area of expertise. The success of the second planning session was discussed and members were encouraged to turn in the completed handouts if they hadn't already done so. The public and members of the planning committee were encouraged to check the web site to review the progress and to make comments through the email links or phone.

June 10, 2003 LEPC 24 attendees *See appendix for minutes of meeting.*

The LEPC held its regularly scheduled meeting and addressed the current situations facing the County as a whole and by each member's area of expertise. Members were encouraged to turn in the completed handouts if they hadn't already. The public and members of the planning committee were encouraged to check the web site to review the progress and to make comments through the email links or by phone.

July 8, 2003 LEPC *See appendix for minutes of meeting.*

The LEPC held its regularly scheduled meeting and addressed the current situations facing the County as a whole and by each member's area of expertise. Members were encouraged to turn in the completed handouts if they hadn't already. The public and members of the planning committee were encouraged to check the web site to review the progress and to make comments through the email links or by phone.

August 12, 2003 LEPC 22 attendees *See appendix for minutes of meeting.*

The LEPC held its regularly scheduled meeting and addressed the current situations facing the County as a whole and by each member's area of expertise. Members were encouraged to turn in the completed handouts if they hadn't already. The public and members of the planning committee were encouraged to check the web site to review the progress and to make comments through the email links or by phone.

September 9, 2003 LEPC *See appendix for minutes of meeting.*

The LEPC held its regularly scheduled meeting and addressed the current situations facing the County as a whole and by each member's area of expertise. Members were encouraged to review the draft plan on the web site and make suggestions. The public and members of

the planning committee were encouraged to check the web site to review the progress and to make comments through the email links or by phone.

October 14, 2003 LEPC 26 attendees *See appendix for minutes of meeting.*

The LEPC held its regularly scheduled meeting and addressed the current situations facing the County as a whole and by each member's area of expertise. Members were encouraged to review the draft plan on the web site and make suggestions. The public and members of the planning committee were encouraged to check the web site to review the progress and to make comments through the email links or by phone.

November 6, 2003 LEPC 22 attendees *See appendix for minutes of meeting.*

The LEPC held its regularly scheduled meeting and addressed the current situations facing the County as a whole and by each member's area of expertise. Members were encouraged to review the draft plan on the web site and make suggestions. The public and members of the planning committee were encouraged to check the web site to review the progress and to make comments through the email links or by phone.

December 9, 2003 LEPC *See appendix for minutes of meeting.*

The LEPC held its regularly scheduled meeting and addressed the current situations facing the County as a whole and by each member's area of expertise. Members were encouraged to review the draft plan on the web site and make suggestions. The public and members of the planning committee were encouraged to check the web site to review the progress and to make comments through the email links or by phone. It was noted that the plan needed to be as soon as possible to be in compliance with the Disaster Mitigation Act of 2000.

A final public meeting held on May 13, 2004 included a presentation outlining the plan's content and comments were heard. A summary and key items were discussed, evaluated, and incorporated into the plan where appropriate. The Yellowstone County website also displayed the plan and provided an e-mail address and telephone number for comments. The plan will continue to be available through the County website, at the Yellowstone County DES office, and at the Billings Library. Additional copies are recorded at each clerk and recorders office for Billings, Broadview, Laurel, and Yellowstone County.

III. Risk Assessment

In accordance with §201.6(c)(2) of the Rule a risk assessment was conducted to evaluate local risks to vulnerable populations and also examine the risk presented by man-made hazards. The risk assessment includes a detailed description of each hazard that could affect Yellowstone County along with an analysis of the vulnerability to the hazard. The goal of the risk assessment process is to determine which hazards present the greatest risk and what areas are cumulatively the most vulnerable to hazards.

The hazard risk assessment requires information about what hazards have historically impacted the community and what hazards may present risks in the future. Identifying historical and possible future hazards was accomplished through interviewing local officials, local emergency planning and response staff, the general public, and through research of historical data.

A. Identifying Hazards

Through Local Emergency Planning Committee Meetings and Community Planning Sessions, natural and manmade disasters were identified through discussions. In addition to the meetings historical hazard data was researched to make sure that no potential hazards were missed in the initial process. HAZUS data was also used in the identification process. These hazards were identified and ranked according to greatest risk for Yellowstone County.

Natural Hazards

1. Flooding
2. Wildfire
3. Wind and Hail Storms
4. Tornado
5. Winter Storms
6. Drought
7. Insect Infestations
8. Urban Fire
9. Dam Failure
10. Expansive Soil
11. Landslides
12. Earthquake
13. Volcanic Ash

Manmade Hazards

1. Transportation/Mobile Incident
2. Hazardous Materials Incident/Accident-Fixed
3. Terrorism/Bio-Terrorism
4. Civil Disturbance/Riot/Labor Unrest
5. Enemy Attack

B. Profiling Hazard Events

Dam Failure

Dam Failure is the cessation of proper functioning or performance of a barrier constructed across a waterway to control the flow or raise the level of water. Yellowstone County has several small dams that would cause little to no damage to the surrounding area, however, dams in neighboring counties could pose some risk.

History

The U.S. Bureau of Reclamation operates one dam within the county. Anita Dam is classified as a high hazard facility. Failure of the dam has the potential to jeopardize as many as 100 lives along a 7-mile reach of the Fly Creek floodplain between the dam and the Yellowstone River. This area includes several private residences, the community of Pompey's Pillar, county roads in Fly Creek floodplain, sections of I90, US Highway 312 and sections of the Burlington Railroad main line in the Yellowstone Floodplain. Although Cooney Dam is located in Carbon County, the Yellowstone River is the primary conduit of floodwater and may cause a 100-year event in Yellowstone County. A dam failed on Cove Creek northwest of the Yellowstone Country Club in the 1970's and flooded the area.

Anita Dam



Statistics

General

- Region ([Map](#)) : Great Plains
- State ([Map](#)) Montana
- County Yellowstone
- Project: [Huntley](#)
- Dam type: [Earthfill](#)
- Location: 6 mi SE of Ballantine
- Watercourse: Offstream Storage
- Reservoir: Anita
- Construction Date: 1933-1937
- National ID Number MT00567
- Hydrologic Unit Code

Dimensions

- [Crest Elevation of Dam:](#)3010.00 ft
- [Structural Height of Dam:](#) 42.00 ft
- [Crest Length:](#)1050.00 ft
- [Top of Joint Use:](#) NA
- [Top of Active Conservation:](#) 3003.00 ft
- [Top of Inactive Conservation:](#) NA
- [Spillway Crest:](#) 3003.00 ft
- [Top of Dead Storage:](#) NA
- [Streambed at Dam Axis :](#) 2973.76 ft

Hydraulics

- [Normal Water Surface Elev:](#) 3003.00 ft
- [Hydraulic Height:](#) 30.0 ft
- [Service Spillway Type:](#)
 - Uncontrolled Crest Yes
 - [Morning-Glory](#) No
- [Crest Length](#) 40 ft
- [Gated](#) No
- Capacity at Elev: 3007.8 ft, 15000 cfs
- [Auxiliary Spillway](#) No
- Capacity at Elev. 0 cfs
- [Outlet Works](#) Capacity at Elevation 2980.0 ft 50 cfs

Hydrology

- Drainage Area: 3.1 sq mi
- [Hydrometeorological Report HMR 55](#)
- Flood Type: All Season General
- Storm Duration: 72 hrs
- [Probable Maximum Flood \(PMF\) Report:](#)
 - Peak Inflow: 10,960 cfs
 - Inflow Volume: 3,165 acre-ft
 - Flow Duration: 1.25 days
 - [PMF Routing MWS Elev.:](#) 3011.4 ft
 - Initial Routing Elev: 3003.0 ft
 - Study Date: March 1986

General Description: The Huntley Project is in south-central Montana. Project works include a rockfill and concrete diversion dam, 32 miles of main canal, 22 miles of carriage canals, 202 miles of laterals, 186.5 miles of drains, a hydraulic turbine-driven pumping plant and an

auxiliary electric pumping plant, both in the main canal, and in an offstream storage reservoir. The project can furnish water to irrigate approximately 30,000 acres.

Plan: The project diverts water from the Yellowstone River to irrigate lands on the south side of the river between Huntley and Pompeys Pillar, Montana. The gravity distribution system extends from the intake of the Main Canal at the diversion dam on the Yellowstone River, in a northeasterly direction for about 32 miles. At mile 13.77, a 35-foot drop in the Main Canal is utilized to lift water into the High Line Canal, which originates at this point. Two-thirds of the 300-cubic-foot-per-second capacity of the Main Canal at the pumps drops through the turbines and develops sufficient power to lift the remaining 100 cubic feet per second to the High Line Canal. An auxiliary 150-horsepower electric pump was installed in 1975 to lift approximately 25 cubic feet per second to the High Line Canal. Anita Reservoir is filled during slack periods with water delivered through the High Line Canal to supplement the supply from the hydraulic pumps during periods of heavy demand.

Water is released from Anita Reservoir into the Reservoir Canal, which flows across Fly Creek to the vicinity of Pompeys Pillar. The High Line Extension Canal diverts from the High Line Canal through a siphon crossing at the downstream toe of Anita Dam to irrigate lands above the Reservoir Canal as far as Fly Creek.

Main Canal and Distribution System: The inlet to the Main Canal of the Huntley Project is located near a 10.5-foot-high diversion dam in the Yellowstone River about 2.5 miles west of Huntley. The Main Canal is about 32 miles long with an operating capacity of 730 cubic feet per second. Three diversion points supply the canal. The Main Canal headworks and auxiliary headworks are located near the Yellowstone River Diversion Dam and a diversion from Pryor Creek is located on the Main Canal 1.8 miles downstream from the dam. This canal extends in a northeasterly direction and passes through several deep rock cuts and three tunnels. The distribution system includes 202 miles of laterals and 186.5 miles of drains.

Pumping Plant: About 1 mile east of Ballantine, a 35-foot drop in the Main Canal develops energy to lift water 42 feet for the irrigation of approximately 5,000 acres of otherwise nonirrigable land. There are two direct-connected turbines and pumps, each capable of delivering about 50 cubic feet second. The pumping plant is semiautomatic in operation, requiring only occasional checking by a ditchrider.

Anita Dam and Reservoir: Anita Dam was not required in the original project plan. Subsequent development of additional lands by local interests necessitated its construction for hold-over storage of water lifted by the turbine-driven pumps during slack periods to reduce the extensive operating time of the pumps. This offstream storage dam was completed by the Civilian Conservation Corps (CCC) in 1937. The dam is an earth structure, 42 feet high with a volume of 143,000 cubic yards, located 1 mile southeast of the Anita Railroad Station. The combination spillway wasteway adjoining the High Line Canal on the north abutment is a concrete-lined chute 40 feet wide with a capacity of 1,500 cubic feet per second. The dam impounds a reservoir with a capacity of 400 acre-feet.

Rehabilitation and Better of the Yellowstone River Diversion Dam: An inspection of the Yellowstone River Diversion Dam in 1956 revealed a crack in the dam due to settlement. Extensive erosion of the streambed had resulted in undercutting of the dam foundation. On January 4, 1957, the Bureau of Reclamation and the Huntley Project Irrigation District signed a

repayment contract to repair the dam. The repairs were completed in the fall of 1957. The project is maintained and operated by the Huntley Project Irrigation District.

History: As the first representative of the United States in the Upper Missouri Valley, Captain Clark of the Lewis and Clark expedition scratched his name and the date of July 25, 1806, on Pompeys Pillar, a large rock landmark overlooking the Yellowstone River. Later, the Yellowstone River became a route for traders, trappers, and pioneers. The earliest settlers in the district were the fur traders, then prospectors and other pioneers came to the area. Some of these people turned to agriculture, raising cattle, or other pursuits; some continued to mine. All contended with the difficulties common to western pioneer life.

The Crow Indian Reservation, established under the ratified treaty of May 7, 1868, included an area much larger than the present reservation. The lands in the Huntley Project, being within the reservation, were not subject to homestead entry and consequently remained undeveloped long after other fertile tracts in the Yellowstone Valley were settled. The cession of lands to the United States by the Crow Indians in 1904 included those in the Huntley Project and opened the way for irrigation and settlement.

Investigations: An act of Congress, approved April 27, 1904, provided that the Reclamation Service should make surveys and investigations for the irrigation of the irrigable area lying south of Yellowstone River and extending along the Bighorn River as far southeast as the Fort Custer military reservation.

Surveys began in August 1904, and in October 1904 the project was designated for early development. Detailed plans were prepared and reviewed by a board of engineers which, on February 26, 1905, declared the project feasible.

Authorization and Construction: The project was authorized by the Secretary of the Interior on April 18, 1905. Construction began October 6, 1905. The first water was delivered in 1908. The Pryor Division was completed in 1908, the Eastern Division in 1914, and the Fly Creek Division in 1915. The High Line Canal was enlarged in 1917 from 60- to 100-cubic-foot-per-second capacity.

Initial construction of the project did not require a diversion dam since the Main Canal intake on the Yellowstone River was level with the riverbed. Development of additional lands by local interests requiring increased diversion necessitated the construction of a small diversion dam which was completed by the Huntley Project Irrigation District in 1934. Anita Dam and Reservoir were constructed by CCC forces and completed in 1937.

Benefits

Irrigation: The principal crops are alfalfa and other hay crops, sugar beets, silage, irrigated pasture, and small grains. The project is a stabilizing influence on the livestock industry in the area, through the production of feed crops.

Municipal Water: The towns of Huntley, Pompeys Pillar, Ballantine, and Worden are served with Huntley Project water.

Recreation: Anita Dam and Reservoir are located 6 miles southeast of Ballantine, Montana near Billings. This offstream storage dam was completed by the Civilian Conservation Corps in

1937. Water is released from Anita Reservoir into the Reservoir Canal which flows across Fly Creek to the vicinity of Pompeys Pillar. As the first representative of the United States in the Upper Missouri Valley, Captain Clark of the Lewis and Clark expedition scratched his name and the date of July 25, 1806 on Pompeys Pillar, a large rock landmark overlooking the Yellowstone River. The Crow Indian Reservation and the Little Bighorn Battlefield National Monument are nearby. The Anita Reservoir, with 32 surface acres and 2 miles of shoreline, offers seasonal opportunities for crappie, catfish, and largemouth bass. No facilities are available.

This information was gathered from the U. S. Bureau of Reclamation web site.

Cooney Dam

Cooney Dam and Reservoir are located on Red Lodge Creek in Carbon County, approximately seven miles west of the Town of Boyd. The dam is owned by the Montana Department of Natural Resources and Conservation. The earth fill dam is 102 feet in height, has a crest length of 2,369 feet, and impounds 28,230 acre-feet of water at full pool. The water is used for supplemental irrigation on approximately 20,000 acres. The original dam was completed in 1937.

The dam was rehabilitated in 1982 to meet current dam safety standards. Cooney Dam is classified as a high-hazard dam. A dam is classified as high-hazard if failure of the dam would endanger lives and property downstream.

Implementation Strategy: The project involved the replacement of approximately 1,000 cubic yards of bedding rock and approximately 2,200 cubic yards of rock riprap along the reservoir side of the dam. The work was performed to replace and enhance the existing riprap that protects the face of the dam from erosion and serves to stabilize the earthen structure. The project was completed in December 2002.

Summary: The replacement riprap should have a service life of 50 years. The total project cost was approximately \$158,000.

Information taken from "Water Storage In Montana Report" submitted to the Fifty-Eighth Montana Legislature by the Department of Natural Resources and Conservation.

Probability of future events

The probability of future dam related events is relatively low in comparison to other potential disasters in Yellowstone County.

Drought

A Drought is a long period of abnormally low rainfall, especially one that adversely affects growing or living conditions. Drought is a special type of disaster because its occurrence does not require evacuation of an area nor does it constitute an immediate threat to life or property. People are not suddenly rendered homeless or without food and clothing. The basic effect of a drought is economic hardship, but it does, in the end, resemble other types of disasters in that victims can be deprived of their livelihoods and communities can suffer economic decline. The effects of drought become apparent with a longer duration because moisture related industries are affected more severely. Non-irrigated croplands are most susceptible to moisture shortages. Rangeland and irrigated agricultural lands do not feel the effects as quickly as the non-irrigated, cultivated acreage, but their yields can also be greatly reduced due to drought. Reductions in yields due to moisture shortages are often aggravated by wind-induced soil erosion. In periods of severe drought, range fires can destroy the economic potential of the livestock industry, and wildlife habitat in, and adjacent to, the fire areas. Under extreme drought conditions, lakes, reservoirs, and rivers can be subject to severe water shortages, which greatly restrict the use of their water supplies. An additional hazard resulting from drought conditions is insect infestation.

Currently, Yellowstone County and most of the state of Montana are in the fifth year of drought. The average annual precipitation in Billings, MT is 14.77 inches based on information gathered from the National Weather Service, www.wrh.noaa.gov and www.weather.com. According to NOAA data Yellowstone County is in a severe drought.

History

August 26 – September 2, 1984: Drought conditions became extreme throughout the county. Wildfire event in Northern Yellowstone County and Musselshell County. 44 homes lost, 145,000 acres of range and timberland burned. County declaration August 28, 1984, followed by a State declaration and a Federal agricultural designation (for rancher assistance only). County response cost \$51,000, City \$1,800.

Summer 1985: Drought. 24,000 acres impacted with 26 producers. Secretary of Ag designation to assist ranchers with spraying grasshoppers that became problematic during the drought.

Summer 1986: Drought. 48,000 acres infested with 65 producers. County declaration resolution 86-37, July 2, 1986 and 86-50, August 11, 1986. No direct County costs. Secretary of Ag designation to assist ranchers with spraying grasshoppers that became problematic during the drought.

Summer 1987: Drought. May 25, County declared emergency, State declared June 1. State paid \$32,847 and the County paid \$109,793 to farmers and ranchers to reimburse spraying costs. 48,000 acres sprayed. 159 producers, total rancher costs to spray \$223,000. County reimbursed \$2.30/acre and state reimbursed \$.68/acre spraying costs. County resolution 87-55 adopting a revenue budget to pay costs. Secretary of Ag designation to assist ranchers with spraying grasshoppers that became problematic during the drought.

Summer 1988: Drought. Aphid infested acres—16,500; Hopper infestation—21,000 acres. \$206,000 spraying costs by 78 producers. County resolution 88-27, May 9. County reimbursed \$49,404 spraying costs for aphids and \$21,174 spraying costs for grasshoppers for a total of \$70,578. Secretary of Ag designation to assist ranchers with spraying grasshoppers that became problematic during the drought.

The Driest Years on record for Billings, MT:

Annual Precipitation	Year	Annual Precipitation	Year
08.41"	1979	11.75"	1954
08.71"	2002	11.99"	1951
09.39"	1960	12.25"	1977
10.36"	1988	12.33"	1996
10.58"	1956	12.46"	1987
10.79"	1952	12.67"	1985
10.92"	1984	12.86"	1983
11.46"	1992	13.35"	1966
11.60"	1959	13.52"	1961
11.70"	1953	13.65"	1994
11.72"	1990		

Probability of future events

The probability of continued or future events is very high. The region has a long history of periodic low moisture years.

Earthquake

An Earthquake is a sudden movement of the earth's crust caused by the release of stress accumulated along geologic faults or by volcanic activity. Earthquakes may cause landslides and rupture dams. Severe earthquakes destroy power and telephone lines, gas, sewer, or water mains, which, in turn, may set off fires and/or hinder firefighting or rescue efforts. Earthquakes also may cause buildings and bridges to collapse. Earthquakes occur along faults, which are fractures or fracture zones in the earth across which there may be relative motion. Montana rated a 2-4 on the Seismic Risk Zone scale listed on the US Geologic Study (USGS), Seismic Hazard mapping web site.

History

While several earthquakes have occurred in Montana, there have been no substantial earthquakes in the Yellowstone County region.

Probability of future events

The probability of future damage from earthquakes is relatively low.

Expansive Soil

Expansive soil is characterized by the top layer of the earth's surface, consisting of rock and mineral particles mixed with organic matter that is capable of expanding or tending to expand. Yellowstone County has several areas that are affected by this condition. Buildings built in these areas have had numerous problems with shifting foundations, cracks, and ground movement problems.

History

As evidenced by the map provided by the Montana Bureau of Mines and Geology at The University of Montana Yellowstone County has several areas are susceptible to expansive soil. In addition, County homeowners have been addressing expansive soil issues related to their homes as they occur.

Probability of future events

Due to the continuing problems related to the expansive soil, it will continue to be a problem as long as buildings are constructed on property with a propensity for this type of soil.

Please see map in Appendix

Flooding

Flooding is an overflowing of water onto land that is normally dry and is a natural event for rivers and streams. Excess water from snowmelt and/or rainfall accumulates and overflows the riverbanks and onto adjacent floodplains. Floodplains are lowlands, adjacent to rivers and lakes that are subject to recurring floods.

A flash flood generally results from a torrential (short duration) rain or cloudburst on a relatively small drainage area. Chinook winds, warm dry winds that can gust to 100 mph and that are typical to the area, often lead to the rapid melting of snow and cause flooding.

Hundreds of floods occur each year, making it one of the most common hazards in all 50 states. Floods kill an average of 150 people a year nationwide. Most injuries and deaths occur when people are swept away by flood currents and most property damage results from inundation by sediment-laden water. Faster moving floodwater can wash buildings off their foundations and sweep vehicles downstream. Pipelines, bridges, and other infrastructure can be damaged when high water combines with flood debris.

Basement flooding can cause extensive damage.

History

Due to snowmelt, ice jams or severe storms, Yellowstone County has experienced major flooding of the Yellowstone River in 1918, 1943, 1944, 1967, 1974, 1975, 1991, 1996 and 1997 with damages totaling conservatively \$25,000,000. Major floods of record occurred on Alkali Creek, Canyon Creek, and Cove Creek in 1937 and 1923. Blue Creek and Pryor Creek flooded severely in 1978. Two of these flood events were declared presidential disasters, 1978 and 1997.

June 11-12, 1937: Flooding, hail, and rainfall (2.78") event covered 60% of the City of Billings. One life lost, 300 people homeless, 2664 homes damaged, \$3 million cost, \$50,000 worth of records lost in Federal building, 8,000 acres of cropland lost at a cost of \$250,000, \$150,000 in road damage, \$200,000 in damage to fairgrounds, irrigation ditch damage at \$100,000 due to Billings Bench Water Association(BBWA) canal break by Highlands Golf Course, and the BBWA flume broke at Alkali Creek. Billings's population was 20,000 at the time of the incident.

August 22, 1965: Rain, hail, flooding in Laurel. Water from a cloudburst broke irrigation ditches above Laurel. Costs included \$113, 000 damage to business district, \$56,000 damage to streets, \$106,000 damage to residential areas, with total damage of \$274,750. Rural area damage was \$55,000.

June 16, 1974: Flood Yellowstone River. \$20,000 road damage, 50 farms and 2640 acres of crop damage, six homes flooded, \$1.1 million total loss, emergency declaration by county disaster committee.

June 14, 1975: Flooding Yellowstone River

May 1978: Flooding--tributaries of Yellowstone River. Over 7 inches of rain fell in Yellowstone and Big Horn Counties. County, State, and Federal Disaster declaration (FDAA-558-DR-3).62 public projects including 8 bridges over Blue Creek and Pryor Creek washed out. Total County cost \$1.445 million, \$1.274 million reimbursed by federal government. Total county cost was \$181,000. Ag damage and private damage not included in cost. Several subdivisions on Blue Creek were flooded.

June 17 & 21, 1991: Flash Flooding. Flooding between Billings and Roundup on Highway 87 North. County bridge washed out on Razor Creek. 1 death—lady in a car washed away. Water poured off rims and homes below and Zimmerman Trail flooded. Rockslides on Zimmerman Trail. Basements in west Billings flooded. \$200,000 estimated damage to homes/businesses, \$41,000 damage to crops.

January 2-3, 1997: Flooding due to ice jams, Yellowstone River. Quick Chinook melted ice and caused ice to break, causing jams and flooding. Several farmsteads in Worden and residences in the Blue Creek areas received damage. City County drain in south Billings also backed up from the river causing minor flooding.

June 6-12, 1997: Flooding on Yellowstone River and Clarks Fork due to heavy snowpack and rains. County, State, and Federal Disaster declaration (FEMA 1183-DR-MT) for all counties along the river drainage. \$1.4 million in damage to include \$388,000 in public damage and \$1 million in irrigation head gate system damage. Dike damage experienced by Huntley. River was 2 feet over flood stage (100 year flood) and prior protection (diking) was given to the water plant in Laurel and Lockwood. A contributing storm on June 10 dropped three inches of rain flooding a south side Billings subdivision (Kings Green). Another cloudburst on July 20th dropped 1.6 inches of rain and caused \$170, 000 in county road damage including Zimmerman

Trail. Airport was closed and 60 mph winds and hail recorded. Sixth Street underpass flooded. County resolution 97-39 on July 29, 1997. In addition, total expenses for the 1997 flooding were \$2,213,982.

Flooding:

Date	Type	Location
06/11/37	Flooding	Billings
08/1965	Flooding	Laurel
06/16/74	Flooding	County Wide
06/14/75	Flooding	Along River
05/1978	Flooding	County Wide
06/1991	Flash Flood	County Wide
01/02/97	Urban/Small Stream	Worden
01/03/97	Flash Flood	Billings
02/02/97	Urban/Small Stream	Laurel
06/01/97	Flood-Yellowstone River	County Wide
06/08/97	Flood -Yellowstone River	County Wide
07/08/97	Flood -Yellowstone River	County Wide
07/30/98	Urban/Small Stream	Billings
07/31/98	Urban/Small Stream	Billings
10/02/98	Urban/Small Stream	Billings

Probability of future events

The probability of future flooding in Yellowstone County is very high. The weather patterns in the region suggest a continued propensity toward receiving large amount of moisture in short periods of time and rapid snow melt resulting from dramatic temperature changes. With the Yellowstone River running through Yellowstone County and the large number of smaller tributaries that feed into the Yellowstone flooding is inevitable.

Infectious/Natural Disease-Human and Animals

A pathogenic microorganism or agent capable of being transmitted by humans and/or animals, characterized by an identifiable group of adverse signs or symptoms.

History

There have been five reported cases of West Nile in Montana as of August 18, 2003. One case each in Stillwater, Custer, Blaine, and Fallon counties. The last case was in Yellowstone County. On September 27th the first death from West Nile was reported in Yellowstone County and another victim seriously ill.

9/03 An outbreak of viral gastroenteritis resulted in 45 residents and approximately 20 illnesses among staff members of a nursing home. Testing indicates the Norwalk virus. The outbreak appears to have spread through person-to-person transmission.

12/03 An outbreak of gastroenteritis sickened approximately 60 to 100 individuals consuming a buffet. The event is under investigation.

Probability of future events

The probability of future infectious/natural diseases in humans and animals in Yellowstone County is relatively high. The mobility of both humans and animals today create a greater risk that new diseases will be transported into the area. In addition new pathogens are being discovered on a regular basis.

Insect Infestations

Insect Infestations are characterized as a large abundance of insects in a concentrated area and primarily occurring during drought years and destructive in nature.

History

Summer 1985: Grasshopper Infestation and Drought. 24,000 acres impacted with 26 producers. Secretary of Ag designation to assist ranchers.

Summer 1986: Grasshopper Infestation and Drought. 48,000 acres infested with 65 producers. County declaration resolution 86-37, July 2, 1986 and 86-50, August 11, 1986. No direct County costs.

Summer 1987: Grasshopper Infestation and Drought. May 25, County declared emergency, State declared June 1. State paid \$32,847 and the County paid \$109,793 to farmers and ranchers to reimburse spraying costs. 48,000 acres sprayed. 159 producers, total rancher costs to spray \$223,000. County reimbursed \$2.30/acre and state reimbursed \$.68/acre spraying costs. County resolution 87-55 adopting a revenue budget to pay costs.

Summer 1988: Russian Wheat Aphid, Grasshopper Infestation and Drought. Aphid infested acres—16,500; Hopper infestation—21,000 acres. \$206,000 spraying costs by 78 producers. County resolution 88-27, May 9. County reimbursed \$49,404

spraying costs for aphids and \$21,174 spraying costs for grasshoppers for a total of \$70,578.

Summer 1992: Cutworm and Russian Wheat Aphid Infestation.

Probability of future events

The probability of future insect infestations is inevitable. Insect Infestations are a cyclical events in Yellowstone County and are expected to occur at regular intervals.

Landslides

Landslides are the downward sliding of relatively dry masses of earth and rock.

History

The Rims and along the river in Yellowstone County experience the most occurrences of landslides. The MBMG map shows the most vulnerable areas of Yellowstone County. The South Hills area and along Blue Creek Road experienced landslides and slippage on roadways in 1978 and 1997.

Probability of future events

The probability of future landslides is high because of the natural terrain in Yellowstone County. The ever-changing Yellowstone River also creates new areas with the potential for landslides as it cuts it way across the County.

Tornado

Tornadoes are a rotating column of air ranging in width from a few yards to more than a mile and whirling at destructively high speeds, usually accompanied by a funnel-shaped downward extension of a cumulonimbus cloud.

History

Tornadoes: There were 6 confirmed tornadoes and 8 funnel clouds reported.

Tornadoes:

Date	F-Scale	Location
05/24/90	F1	Unknown
06/19/91	F0/F0	Unknown
06/21/91	F0	Unknown
07/20/97	F0	Laurel
07/04/98	F0	Billings Heights

Funnel Clouds:

06/18/97		Lockwood
05/13/98		Billings
07/04/98		Laurel
07/04/98		Billings Heights
07/04/98		Worden
06/05/99		Billings
08/15/99 (2)		Billings

Probability of future events and community impact

There is no indication that tornadic activity within Yellowstone County will decrease. Because of this there is a high probability of future events.

Urban Fire

An urban fire is the uncontrolled ignition and burning of materials on a large scale in a city environment.

Statistics from the 2002 Annual Report of the City of Billings Fire Department, 8,610 calls were received. Of those received, 453 were fire calls and 6,498 were rescue calls. The dollar loss in past years from urban fires were \$3,090,223 in 1997, \$2,083,101 in 1998, \$1,679,856 in 1999, \$2,296,780 in 2000, \$4,722,283 in 2001, and \$4,147,132 in 2002.

History

Northern Hotel fire of 1940.

James Hotel, late 1960's

January 17, 1963: Miracle Gas Company at 421 N. 20th Street in Billings. The building fire occurred in the afternoon as children were just getting out of school for the

day one block away. This caused an extremely hazardous situation with the storage of gas on the premises. It was the largest fuel explosion in Billings history at that time.

Super 8 Motel, 1980's, explosion and fire.

Country Inn and Suites, 2003, fire burned building to ground while under construction.

Yellowstone Country Club, 1970's, Clubhouse fire

Probability of future events

The probability of future events is high as construction projects and the population of Yellowstone County increases.

Utility Outage

A utility outage is a disruption in a commodity or service, such as electricity, water, or public transportation that is provided by a public utility.

History

Yellowstone County has both urban and rural areas. These diverse sections of the county face different problems with utilities. Urban residents face broad area power outages due to storms, both winter and summer, and system failures due to high use or faulty equipment. Rural residents face power outages that affect all of their utilities that rely on electricity to operate including water and phone service. These events have occurred on a sporadic basis throughout the county and typically don't last very long. However, in severe winter storms where access to the area of the outage is not possible, it has been known that residents go without services for days at a time. This puts rural residents at risk and limits their access in an emergency.

Probability of future events

The probability of future utility outages is high due to increased demand on the systems, and the propensity for severe weather in Yellowstone County.

Volcanic Ash

Volcanic ash is produced by or discharged from a volcano.

History

Ash from Mount St. Helen's eruption, May 18, 1980. Mount St. Helens erupted in Washington State. Governor declared "State of Emergency" and closed all schools, businesses, government offices. There was much confusion due to the lower particulate count in eastern Montana. Western Montana was hardest hit with the ash—4-6 inches deep.

Probability of future events

While the chance of another volcanic occurrence similar to Mount Saint Helen is extremely low, it is still a hazard that needs to be addressed. Other active or

potentially active volcano existing within the Pacific Northwest that could cause numerous problems for residents of Yellowstone County. Yellowstone County is approximately 90 miles from Yellowstone National Park which is an active geothermal area.

Wildfire

A wildfire is a raging, rapidly spreading fire. These types of fires include grass fires, forest fires and scrub fires either started by nature or manmade. Severe wildfire conditions have historically represented a threat of potential destruction within Montana. Negative impacts of wildfire include loss of life, property and resource damage or destruction, severe emotional crisis, widespread economic impact, disrupted and fiscally impacted government services, and environmental degradation. The wildland/urban interface is defined as the zone where structures and other human development meet with undeveloped wildland or vegetative fuel. In south-central Montana, the wildland/urban interface typically is where the edge of local communities adjoin agricultural fields, many of which are in CRP. U.S. Forest Service (USFS) data for 1990 indicate that 25.7 percent of reported wildfires were caused by arson. Other ignition sources were debris burns (24 percent); lightning (13.3 percent); and other (16.7 percent). Lightning can present particularly difficult problems when dry thunderstorms move across an area suffering from seasonal drought. In northeast Montana, the railroad is a relatively common ignition source of wildfires. Multiple fires can be started simultaneously, as is often the case in Montana. In dry fuel areas, these fires can cause massive damage before containment. Dry grass, associated with farmland in CRP, is the primary fuel for Montana wildfires. The rate of spread of a fire varies directly with wind speed. Numerous wildfires have impacted residents in Montana.

History

August 26 – September 2, 1984: Wildfire—Hawk Creek and Drought conditions became extreme throughout the county. Wildfire event in Northern Yellowstone County and Musselshell County. 44 homes lost, 145,000 acres of range and timberland burned. County declaration August 28, 1984, followed by a State declaration and a Federal agricultural designation (for rancher assistance only). County response cost \$51,000, City \$1,800.

Wildland fires are also problematic. In 1984, over 100,000 acres burned in the north part of the county that included 6 structures and one loss of life. As subdivisions are built in the urban wildland interface areas of our county outside the building districts surrounding the incorporated areas, the loss of property and life will increase. Approximately \$49,000,000 of property is at risk in the urban/wildland interface area of the county.

Probability of future events

As more and more landowners choose to place themselves in the urban/wildland interface the probability for future events grows. Yellowstone County is growing quickly and is facing a dramatic increase in the number of individuals building in areas highly susceptible to wildland fire.

Wind and Hail Storms

An atmospheric disturbance manifested in strong winds accompanied by rain, snow, or other precipitation and often by thunder and lightning. Wind with a speed from 64 to 73 miles per hour, according to the Beaufort scale.

History

Based on available data there were 58 reports of large damaging hail greater than 3/4 inch in diameter.

Date	Size (inches)	Location
05/31/90	1.25	County Wide
05/19/91	3.00	County Wide
05/20/91	3.00	County Wide
06/07/91	1.75	County Wide
06/24/91	1.75	County Wide
07/20/91	0.75	County Wide
08/16/93	1.00/1.25	Ballantine/Pompeys Pillar
05/16/94	0.75	Laurel
06/16/94	1.00	Laurel
07/05/94	2.00	Billings Heights
07/24/94	1.00	Toledo
07/11/95	1.00	Yellowstone County
09/10/95	1.00	Huntley
06/26/96	1.00	Broadview
07/02/96	0.75	Laurel
07/05/96	0.75	Billings
07/05/96	3.00	Shepherd
07/05/96	0.75	Lockwood
07/25/96	0.75	Billings
06/06/97	0.75	Billings
06/18/97	1.75	Billings
06/18/97	0.88	Billings Heights
07/01/98	0.88	Billings
07/04/98	0.75	Shepherd
07/04/98	1.75	Billings
07/04/98	1.00	Lockwood
07/04/98	2.50	Huntley
07/04/98	1.00	Worden
07/05/98	0.75	Shepherd
07/27/98	1.00	Billings
07/31/98	1.25	Billings
04/28/99	1.75	Billings
04/28/99	1.00	Lockwood
05/21/99	0.88	Pompeys Pillar
06/21/99	0.75	Pompeys Pillar
07/20/99	1.00	Billings
07/20/99	0.88	Huntley
08/07/99	0.88	Comanche
08/13/99	0.75	Shepherd
05/29/00	1.00	Worden
05/29/00	1.00	Pompeys Pillar

Severe Thunderstorm Wind Damage/High Wind: There were 34 severe thunderstorm wind damage reports and 9 high wind-damaging events recorded.

Severe Thunderstorms:

Date	Speed (kts)	Location
07/20/90	Unknown	Yellowstone County
08/20/90	Unknown	Yellowstone County
06/19/91	Unknown	Yellowstone County
07/14/91	Unknown	Yellowstone County
06/16/94	Unknown	Laurel
06/29/94	Unknown	Billings
07/09/94	65	Laurel
07/09/94	61	Billings
07/09/94	Unknown	Big Horn
07/09/94	61	20 South of Billings
07/09/94	65	Huntley
07/28/94	Unknown	Billings
07/11/95	Unknown	Raynesford
07/29/95	54	Yellowstone County
07/02/96	52	Worden
07/05/96	52	Billings
06/17/97	61	Laurel
06/17/97	78	Ballantine
06/29/97	52	Laurel
07/09/97	69	Billings Heights
07/20/97	51	Billings
07/20/97	69	Billings
08/27/97	59	Pompeys Pillar
09/09/97	59	Billings Airport
06/13/98	53	Billings Airport
07/04/98	52	Billings
07/27/98	52	Billings Airport
07/31/98	52	Billings
08/23/98	61	Pompeys Pillar
10/08/98	Unknown	Billings
06/18/99	52	Billings
06/21/99	Unknown	Worden
07/20/99	52	Billings
07/20/99	52	Acton

High Wind

Date:	Speed (kts):	Location(s):
12/26/98	61	County Wide
12/28/98	60	County Wide
02/01/99	80	County Wide
03/16/99	62	County Wide
03/26/99	50	County Wide
10/31/99	70	County Wide
01/09/00	73	County Wide
04/05/00	69	County Wide
07/00/02	72	County Wide

Probability of future events

Wind and hail storms are a yearly occurrence in Yellowstone County. There is a high probability of severe weather.

Winter Storms

Winter Storms are an atmospheric disturbance manifested in strong winds accompanied by freezing rain, sleet, or snow, during the coldest season of the year, occurring between autumn and spring, extending in the Northern Hemisphere from the winter solstice to the vernal equinox. Winter storms and blizzards follow a seasonal pattern that begins in late Fall and last until early Spring. These storms have the potential to destroy property and, kill livestock and people. Winter storms may be categorized as sleet, ice storms or freezing rain, heavy snowfall or blizzards. Blizzards are characterized by low visibility caused by high winds and blowing and drifting snow. A severe winter storm is generally a prolonged event involving snow or ice and extreme cold. The characteristics of severe winter storms are determined by the amount and extent of snow or ice, air temperature, wind speed, and event duration. Severe winter storms create conditions that disrupt essential regional systems such as public utilities, telecommunications, and transportation routes. Ice storms accompanied by high winds can have destructive impacts, especially to trees, power lines, and utility services. Winter storms are frequently the precursors to spring flooding due to snow melt runoff from the near by mountains into the area rivers and streams.

History

Yellowstone County faces winter storms of varying degrees each year. While most storms are not acknowledged as a major event, residents deal with these storms each year. When a comparison is made between the amounts of snow, wind, etc. needed to declare a disaster situation in Montana verses a storm on the East Coast, Montana must have a much more severe event before a disaster is declared. Two inches of snow on the East Coast shuts down schools, government, and snarls traffic. While in Montana, it takes an event of a much larger magnitude to even effect travel, schools, or work. Even a 12-inch snow event causes little disturbance to resident's daily life.

April 1955: Snow and Blizzard conditions

January 1979: Snow Emergency, Blizzard. 51 inches of snow since November, 8-12' drifts, 40 families snowbound, livestock snowbound and hay dropped by helicopter, rural schools closed, 400-500 miles of rural roads closed, had to use rotary plows to remove snow, Broadview area hardest hit, \$200,000 estimated cost.

April 8-9, 2001: Winter storm. Failure of Yellowstone Valley Electric Cooperative's power lines and poles on the Crow Indian reservation in Yellowstone and Big Horn Counties resulted in County resolution 01-46, May 22, 1991 and a Federal declaration for the Crow Reservation only. \$22,000 damages.

There were 15 reports of severe winter storms/heavy snow events from 1990 forward.

Date	Amount (Inches)	Location
11/25/96	4	Billings
12/25/96	5	Billings
12/28/96	6	South of Billings
12/28/96	4	Pompeys Pillar
12/28/96	6	Big Horn
04/06/97	11	Billings
03/03/98	7-12	County Wide
03/28/98	5-7	County Wide
12/29/98	Ice Storm	County Wide
03/04/99	4-8	County Wide
02/25/00	6-10	County Wide
03/07/00	4	Billings

Probability of future events

Winter storms are a common occurrence in Yellowstone County. There is a high probability of severe weather.

Manmade Hazards

Civil Disturbance/Riot/Labor Unrest

An incident of Civil Disturbance/Riot/Labor Unrest is a group of highly agitated individuals causing injury to persons and/or property. Civil unrest is not a common hazard affecting Montana; however, Garfield County made national news during the Montana Freeman crisis. In the early spring of 1996, hundreds of FBI agents surrounded the Ralph Clark ranch complex near Jordan, Montana for a total siege of 81 days. The government claimed that the nearly thirty people inside were of a radical anti-government and racist religious sect who had written bad checks and threatened judges, among other things. Billings and Yellowstone County were impacted by these events as a staging area for law enforcement, housing suspects in the County Jail, and during the Federal trial.

History

Within the last twenty-years there have been two teachers' strikes that had incidents of violence against those who crossed the picket lines and those that were vocal about their opinions. Within the last ten-years two union-trucking industry strikes have had incidents of violence. While the history is not inclusive, these events stood out in participant's minds or were found during research for this plan.

Probability of future events

There is a high probability of future civil disturbance events. As area populations continue to increase the chances of conflict increase.

Enemy Attack

An enemy attack is a planned assault against an area or individual(s) for the sole purpose of inflicting harm. Even though the occurrence of an enemy attack is very low, the recent terrorist attack on September 11, 2001 is an example of our vulnerability to open society to such events. The Nuclear Powers and the "Axis of Evil" Nations are continually being evaluated by the Defense Department as potential threats to the United States of America.

History

Yellowstone County has not been under enemy attack to date. However, with the events of September 11, 2001 and potentially dangerous groups using Montana as a base for their operations Yellowstone County must consider these threats.

Probability of future events

The probability of future enemy attack is low in Yellowstone County. But, it cannot be discounted because Yellowstone County is the largest population base in the state and has many refineries, a large airport, large entertainment complex, and many government agencies. All of these would be potential targets if these groups wanted to disable the region.

Hazardous Materials Incident/Accident-Fixed

Hazardous Materials Incident/Accident-Fixed is any incident involving potentially hazardous materials or at a location where there is a predetermined expected level of an incident occurring. These are distinct from natural hazards primarily in that they originate from human activity. The term "technological hazards" refers to the origins of incidents that can arise from human activities such as the manufacture, transportation, storage, and use of hazardous materials. Technological emergencies are accidental and their consequences are unintended. Examples of technological hazards are industrial accidents at either fixed facilities or transportation, and failure of a critical infrastructure component.

History

The history of hazardous materials incidents in Yellowstone County was compiled by participants in the identification process and by research. It is not however an all inclusive list of events in Yellowstone County.

Yellowstone County has experienced hazardous material incidents in 1989, 1991, 1992, 1993, 1998, 1999, and 2001. These incidents originated from refineries, railroad tank cars, highway tankers and pipelines. Within the county limits there are three refineries, 3 pipelines, US Interstate 90 and Burlington Northern Rail Line.

January 17, 1963 Miracle Gas Company at 421 N. 20th Street in Billings. The building fire occurred in the afternoon as children were just getting out of school for the day one block away. This caused an extremely hazardous situation with the storage of gas on the premises. It was the largest fuel explosion in Billings history at that time.

Super 8 Motel, 1980's gas explosion

September 4, 1986: Cenex pipeline rupture in Lockwood. 8" pipeline lost 30,000 gallons of gasoline in Coulson irrigation ditch. A 40" long gash on pipe caused by a backhoe caused it to rupture. Lockwood Water User wells were tested but no contamination was found. During the event 12 businesses and 50 people were evacuated due to fumes.

January 28 – February 3, 1989: Cenex pipeline rupture at Huntley. 8" pipeline ruptured with 8-10,000 gallons of gasoline recovered from frozen creek. 4 homes evacuated, Road closed, Montana Rail Link Railroad closed. Estimated damage and cleanup \$15,000.

February 21 – 25, 1989: Explosion at home on Custer Avenue, Billings. Entire home destroyed due to bottled propane gas in home. 1 death, 1 injury, 7 homes in neighborhood damaged by concussion and debris. Estimated cost \$1.5 million.

July 1, 1992: Tanker truck rolled over in Lockwood leaking LPG (propane). Farstad Oil Company truck with 9,000 gallons of LPG. 3000 people evacuated along with ExxonMobil Refinery, I-90 closed, electricity shut off to homes due to danger of ignition. Six and one half hours to contain.

June 22-24, 1993: Railroad tank car owned by Gas Supply Co. leaked LPG due to structural defect in metal. Local area in Lockwood evacuated, I-90 and MRL railroad closed. Clean up expenses \$30,000.

March 24, 1994: Farstad Oil Company tanker truck with diesel fuel rolled over in Lockwood. I-90 closed and 3,000 gallons of fuel lost. Response costs \$2,900.

October 22, 1998: Cenex refinery explosion, Laurel. Hydrogen gas line ruptured causing explosion and fire. No injuries. \$2.5 million in damage to refinery.

July 20, 1999: Train derailment, downtown Billings. Six MRL cars derailed, 2 cars carried 72K gallons of LPG. 16 blocks evacuated as a precaution. It was a 16 hour incident with \$22,641 response costs.

October 7, 2002 Orchard School, Billings. Gasoline spill caused the temporary evacuation of students. The Fire Department ventilated the building.

October 30, 2002 V-1 Propane at 6650 S. Frontage Road, Billings. Gas Explosion and fire forces the evacuation of surrounding businesses and an elementary school and shut down Interstate 90 for about an hour before fire crews extinguished the blaze.

Probability of future events

Yellowstone County has a high probability of occurrences of hazardous material incidents. With two rail yards in Yellowstone County, the largest airport in the state located in close proximity to downtown Billings, three refineries, and many associated chemical industries, it is anticipated that more events will happen in the future and will affect a growing population.

Terrorism/Bio-Terrorism

Terrorism/Bio-Terrorism is the use of biological agents, such as pathogenic organisms or agricultural pests, for terrorist purposes. The term “terrorism” refers to intentional, criminal, malicious acts. Terrorism hazards include the use of Weapons of Mass Destruction such as, CBRNE(chemical, biological, radiological, nuclear, explosive weapons), and armed attacks, industrial sabotage and “cyber terrorism”. Whether intentional or accidental, human-caused disasters involve the application of one or more modes of harmful force or destruction. These modes are defined as contamination (chemical, biological, radiological, or nuclear hazards), energy (explosives, arson, and electromagnetic waves), or failure or denial of service (sabotage, infrastructure breakdown, and transportation service disruption). The greatest human-caused hazard risk is the large quantities of propane, anhydrous ammonia, and petroleum stored in various locations, and the lack of security at these bulk storage facilities.

History

Participant discussions provided insight into the events that have occurred in Yellowstone County. The most noteworthy were recent hoaxes of anthrax, bomb threats to schools and government buildings including Post Offices, Federal Building, Courthouse, congressional buildings, and college campuses. In addition, participants mentioned anthrax mailbox incidents and the freeman incident.

Probability of future events

While the probability of an event of this sort in Yellowstone County, Montana is relatively low compared to major cities in the United States, the county must be prepared. As the largest populated county in Montana, if an event were to occur in Montana the probability is high that it would occur in Yellowstone County.

Transportation/Mobile Incident

A transportation/mobile incident is any incident that occurs where the exact location cannot be predetermined. Any incident involving a mode of transportation including car/truck, rail, pipeline, air, or mass transit is classified as a mobile incident. These can include incidents involving the transport of hazardous materials.

History

Several transportation incidents have occurred in Yellowstone County. The two listed below are the most significant incidents to date.

December 18, 1992: Aircraft Crash/Structural Fire. Twin engine Cessna Citation with 8 WAPA employees on board crashed into the School District 2 warehouse. All

individuals were killed and the warehouse was destroyed which stored school records, books, supplies, food, and vehicles for SD 2. \$4 million in damage.

A train derailment in 1999 caused evacuation of downtown Billings.

There have been 128 aviation incidents reported in Yellowstone County from 1964 to the present. Of those events, 14 resulted in the fatality of 32 individuals.

Probability of future events

Yellowstone County has a high probability of occurrences of transportation/mobile incidents. With a major rail line running through downtown Billings in Yellowstone County, the largest airport in the state located in close proximity to downtown Billings, and a large section on Interstate 90 and Interstate 94 within the county's jurisdiction, it would be expected that more events will happen in the future. Risks will increase as the population of the county continues to increase.

C. Assessing Vulnerability: Identifying Assets

1. Summary of Impact on Community

Each hazard identified through the plan development process will have an affect on the community. The impacts will be financial, economic, personal, and emotional. In assessing Yellowstone County's vulnerability to these identified hazards we have taken into account buildings, infrastructure, critical facilities, and residents. By reviewing the history of hazardous events in Yellowstone County we can estimate the potential loss if another similar event were to occur.

Hazard Impact

Hazard areas describe the geographic extent to which a hazard can impact a jurisdiction and are uniquely defined on a hazard by hazard basis. For the purposes of conducting risk analysis, all the hazard impact areas are defined as a percentage of the total County area affected. These percentage charts are included in the appendix.

Flooding

Community impact due to flooding is widespread, affecting large areas. Recorded flood events show that in the last six year 18 events have occurred. This equates to a frequency of three per year. Flooding occurs along the Yellowstone River and its tributaries. While most of the affected area is non-developed farm and ranch land, the communities of Laurel and Billings have experienced damaged buildings and infrastructure because of these events.

Wildfire

Community impact due to wildfire can vary greatly on the location of the event. Yellowstone County has very diverse terrain, some areas with very little vegetation and others with an abundance of trees, scrub pine, and wild grasses. Wildfires impact farm and ranch land, livestock, structures, individuals and utilities.

Wind and Hail Storms

Wind and hail storms impact Yellowstone County every year. In the last 48 years, 290 events were recorded resulting in an average frequency of six per year. These storms can affect farm and ranch land, private and public structures, utilities, and individuals.

Tornadoes

Yellowstone County has experienced 31 tornadoes in the past 48 years, meaning the frequency is .65 per year. Tornadoes will impact urban structures, farm and ranch land, private and public structures, utilities, and individuals.

Winter Storms

In the last eight years, 43 winter storm events were recorded in Yellowstone County. This represents a frequency of 5.4 storms per year. These storms affect the urban and rural residents, utilities, livestock, private and public structures and individuals.

Drought

Yellowstone County has seen dramatic affects of drought over the years. The impact to the county is far reaching. Drought has a severe impact on farming and ranching, the water supply, residential wells, and individual's health. In January 2004, Yellowstone County entered its sixth year of drought.

Insect Infestations

Insect infestations tend to coincide with drought creating a double impact to the County. They have a large impact on farming and ranching, as well as creating health concerns for residents.

Urban Fire

Urban fires are unpredictable, but often cause an economic loss to individuals, damaging private and public structures, utilities, and loss of life.

Dam Failure

The impact on the community from a dam failure will affect a smaller segment of the population. It may affect farming and ranching industry, the water supply, utilities, and a potential for loss of life.

Expansive Soil

Expansive soil impacts the community by affecting the soundness of private and public structures built in these areas. Utilities may be affected greatly as the ground continues to shift causing damage to underground pipes and lines. As these areas continue to be developed more potential damage is anticipated. Many residents are not aware of the possibility of expansion soil and are not educated in how to research if the area in question has been found to have this type of soil. The areas within the county with this type of soil have been identified by the Bureau of Mines and Geology and are identified on the map in the appendix.

Landslides

The terrain in Yellowstone County has some potential for landslides as shown on the Bureau of Mines and Geology map located in the appendix. These areas represent a very small portion of the entire County and would affect a individual land owner or small subdivision. The impact of a landslide would be very small in comparison to other hazards.

Earthquake

The impact of an earthquake on Yellowstone County could be substantial. It has the potential to affect urban, heavily populated areas disrupting utility services, damaging infrastructure, private and public buildings, and a potential for loss of life.

Volcanic Ash

Volcanic ash, either from volcanic activity in Yellowstone National Park or to the west in Washington and Oregon, would impact the entire County causing health concerns for humans and livestock, and damaging equipment, including utilities.

Transportation/Mobile Incident

The impact of a transportation/mobile incident would be great because two major highways intersect in Yellowstone County, I-90 and I-94. Both of these interstates are used heavily by commercial vehicles hauling chemicals, petroleum products, and farm products and more. An incident would block all east-west traffic and detain large numbers vehicles and individuals. In addition to interstate travel, rail lines run through Yellowstone County that provides the only means of rail travel across this region.

Hazardous Materials Incident/Accident-Fixed

Yellowstone County is home to three major refineries and has several chemical businesses that house large amounts of hazardous materials. Any of these facilities could cause a major incident and some have occurred in the past. A hazardous materials incident could impact a large area of the County and gases release from the event could affect even more.

Terrorism/Bio-Terrorism

A Terrorism or Bio-Terrorism event has the potential to impact a large area of the County or a small but significant number of people depending on the location and type of event.

Civil Disturbance/Riot/Labor Unrest

Impact from a civil disturbance, riot, or labor unrest would probably affect the more populated areas of the County including the cities of Billings, Laurel, or Broadview. This could impact utilities, critical facilities, individuals, and business.

Enemy Attack

The impact of an enemy attack on Yellowstone County would impact the more populated areas of the County causing harm to individuals, disrupting utilities, and halting business activities.

2. Types and numbers of existing and future

a. Buildings

Building stock was determined using the FEMA HAZUS software program. Building stock values were determined at the census block level and data is provided in the appendix. The total value of structures in Yellowstone County based on this data is \$13,255,602,000.

b. Infrastructure and Critical Facilities

Infrastructure and critical facilities are of importance because they are the nucleus of emergency operations. Critical facilities are of great concern because they provide the immediate services and products that are vital to preserve the well being of the community including public safety, emergency response, and/or disaster recovery functions.

Critical facilities are facilities crucial to government response and recovery activities. Critical facilities include 911 centers, emergency operations centers, police stations, fire stations, public works facilities, sewer and water facilities, hospitals, roads and bridges, and emergency shelters. If these facilities are involved in an event, they could cause serious impacts in a disaster situation. Critical facilities also include those facilities that are vital to the continued delivery of community services or have an impact on large vulnerable populations. These facilities may include jails, law enforcement buildings, public services buildings, courthouses and juvenile service buildings, hospitals, nursing homes, and schools.

Schools

Universities/Colleges

MSU Billings

Rocky Mountain College

MSU College of Technology

Secondary Schools

Name	Address	City	State	ZipCode
BILLINGS CENTRAL CATHOLIC H S	3 BROADWATER AVENUE	BILLINGS	MT	59101
TRINITY LUTHERAN SCHOOL	2802 BELVEDERE DRIVE	BILLINGS	MT	59102
YELLOWSTONE VLY CHRISTIAN SCH	400 7TH AVENUE	LAUREL	MT	59044
BILLINGS CHRISTIAN SCHOOL	4525 GRAND AVENUE	BILLINGS	MT	59106
ST FRANCIS PRIMARY SCHOOL	511 CUSTER AVE	BILLINGS	MT	59101
ST FRANCIS SCHOOL-INTERMEDIATE	1734 YELLOWSTONE AV	BILLINGS	MT	59102
ST FRANCIS UPPER SCHOOL	205 N 32ND ST	BILLINGS	MT	59101
BILLINGS MONTESSORI SCHOOL	2316 REHBERG LANE	BILLINGS	MT	59102
NEW LIFE ASSEMBLY SCHOOL	3950 TEMPLE PLACE	BILLINGS	MT	59106
APOSTLES LUTHERAN SCHOOL	3140 BROADWATER AVE	BILLINGS	MT	59102
YELLOWSTONE ACADEMY	1732 SOUTH 72ND ST WEST	BILLINGS	MT	59106
CENTRAL ACRES SDA SCHOOL	3204 BROADWATER	BILLINGS	MT	59102
ARROWHEAD SCHOOL	2510 38TH STREET WEST	BILLINGS	MT	59102

BEARTOOTH SCHOOL	1345 ELAINE ST	BILLINGS	MT	59105
BENCH SCHOOL	505 MILTON ROAD	BILLINGS	MT	59105
BITTERROOT SCHOOL	1801 BENCH BLVD	BILLINGS	MT	59105
BOULDER SCHOOL	2202 32ND STREET WEST	BILLINGS	MT	59102
BROADWATER SCHOOL	415 BROADWATER	BILLINGS	MT	59102
BURLINGTON SCHOOL	2135 LEWIS AVE	BILLINGS	MT	59102
CENTRAL HEIGHTS SCHOOL	120 LEXINGTON	BILLINGS	MT	59102
GARFIELD SCHOOL	3212 1ST AVENUE SOUTH	BILLINGS	MT	59101
HIGHLAND SCHOOL	729 PARKHILL	BILLINGS	MT	59102
MCKINLEY SCHOOL	820 NORTH 31ST ST	BILLINGS	MT	59101
MEADOWLARK SCHOOL	221 29TH STREET WEST	BILLINGS	MT	59102
MILES AVENUE SCHOOL	1601 MILES AVE	BILLINGS	MT	59102
NEWMAN SCHOOL	605 SOUTH BILLINGS BLVD	BILLINGS	MT	59101
ORCHARD SCHOOL	120 JACKSON ST	BILLINGS	MT	59101
POLY DRIVE SCHOOL	2410 POLY DRIVE	BILLINGS	MT	59102
PONDEROSA SCHOOL	4188 KING AVENUE EAST	BILLINGS	MT	59101
RIMROCK SCHOOL	2802 13TH STREET WEST	BILLINGS	MT	59102
ROSE PARK SCHOOL	1812 19TH STREET WEST	BILLINGS	MT	59102
SANDSTONE SCHOOL	1440 NUTTER BLVD	BILLINGS	MT	59105
WASHINGTON SCHOOL	1044 COOK AVE	BILLINGS	MT	59102
ALKALI CREEK SCHOOL	681 ALKALI CREEK ROAD	BILLINGS	MT	59105
CASTLE ROCK 7-8	1441 GOVERNOR'S BLVD	BILLINGS	MT	59105
LEWIS & CLARK 7-8	1315 LEWIS AVE	BILLINGS	MT	59101
BIG SKY ELEMENTARY	3231 GRANGER AVENUE EAST	BILLINGS	MT	59102
EAGLE CLIFFS ELEMENTARY	1201 KOOTENAI	BILLINGS	MT	59105
RIVERSIDE 7-8	3700 MADISON AVE	BILLINGS	MT	59101
WILL JAMES 7-8	1200 30TH STREET WEST	BILLINGS	MT	59102
BILLINGS SR HIGH SCHOOL	425 GRAND AVE	BILLINGS	MT	59101
BILLINGS WEST HIGH SCHOOL	2201 ST JOHNS AVE	BILLINGS	MT	59102
SKYVIEW HIGH SCHOOL	1775 HIGH SIERRA BLVD	BILLINGS	MT	59105
BLUE CREEK SCHOOL	3652 BLUE CREEK ROAD	BILLINGS	MT	59101
BROADVIEW SCHOOL	13935 1ST ST	BROADVIEW	MT	59015
BROADVIEW 7-8	13935 1ST ST	BROADVIEW	MT	59015
BROADVIEW HIGH SCHOOL	13935 1ST ST	BROADVIEW	MT	59015
CANYON CREEK SCHOOL	3139 DUCK CREEK ROAD	BILLINGS	MT	59101
CANYON CREEK 7-8	3139 DUCK CREEK ROAD	BILLINGS	MT	59101
CUSTER SCHOOL	304 4TH AVE	CUSTER	MT	59024
CUSTER HIGH SCHOOL	304 4TH AVE	CUSTER	MT	59024
CUSTER 7-8	304 4TH AVE	CUSTER	MT	59024
ELDER GROVE SCHOOL	1532 SOUTH 64 STREET W	BILLINGS	MT	59106
ELDER GROVE 7-8	1532 SOUTH 64 STREET W	BILLINGS	MT	59106
ELYSIAN SCHOOL	6416 ELYSIAN ROAD	BILLINGS	MT	59101
HUNTLEY PROJECT ELEM K-6	1477 ASH ST	WORDEN	MT	59088
HUNTLEY PROJECT HIGH SCHL	1477 ASH ST	WORDEN	MT	59088
HUNTLEY PROJECT 7-8	1477 ASH ST	WORDEN	MT	59088
INDEPENDENT SCHOOL	2907 ROUNDUP ROAD	BILLINGS	MT	59105
FRED W GRAFF SCHOOL	417 EAST SIXTH	LAUREL	MT	59044
SOUTH SCHOOL	606 SW FIFTH	LAUREL	MT	59044

WEST SCHOOL	502 EIGHTH AVE	LAUREL	MT	59044
LAUREL MIDDLE SCHOOL	410 COLORADO AVE	LAUREL	MT	59044
LAUREL HIGH SCHOOL	203 EAST 8TH	LAUREL	MT	59044
LOCKWOOD MIDDLE SCHOOL	1932 US HIGHWAY 87-RTE 2	BILLINGS	MT	59101
LOCKWOOD PRIMARY	1932 US HIGHWAY 87-RTE 2	BILLINGS	MT	59101
LOCKWOOD 7-8	1932 US HIGHWAY 87-RTE 2	BILLINGS	MT	59101
MORIN SCHOOL	8824 PRYOR ROAD	BILLINGS	MT	59101
PIONEER SCHOOL	1937 DOVER ROAD	BILLINGS	MT	59105
SHEPHERD SCHOOL	7842 SHEPHERD ROAD	SHEPHERD	MT	59079
SHEPHERD 7-8	7842 SHEPHERD ROAD	SHEPHERD	MT	59079
SHEPHERD HIGH SCHOOL	7842 SHEPHERD ROAD	SHEPHERD	MT	59079
YELLOWSTONE ACADEMY ELEM	1732 SOUTH 72ND STREET W	BILLINGS	MT	59106

Hospitals and Clinics

DEACONESS BILLINGS CLINIC	2800 10TH AVENUE NORTH	BILLINGS	MT	59101
ST VINCENT HEALTHCARE	1233 NORTH 30TH STREET	BILLINGS	MT	59101
Same Day Care	2825 8 th Ave. North	Billings	MT	
Same Day Care	760 Wicks Lane	Billings	MT	
Same Day Care	2675 Central Avenue	Billings	MT	
Welch Heart Center	1020 N. 27 th	Billings	MT	
Sports Medicine	2708 8 th Ave. North	Billings	MT	
Wellness Center	19 North 25 th Street	Billings	MT	
Healthsouth Surgery Center	940 N 30 th	Billings	MT	
Northern Rockies Radiation	1041 N 29 th	Billings	MT	
Roundup Memorial Hospital	1202 3 W	Roundup	MT	
Womens Center	90 Poly Drive	Billings	MT	
Broadwater Walk In Clinic	2019 Broadwater Avenue	Billings	MT	
Deering Clinic	123 S. 27 th Street	Billings	MT	
Heights Family Practice	44 Wicks Lane	Billings	MT	
West Grand Family Medicine	2750 Grand Avenue	Billings	MT	

Private Critical Infrastructure

Transportation Facilities

Highways

Interstate System – I90/I94 through Yellowstone County
Bridges (over Yellowstone River)

Railroads – MRL Train Yards at Laurel

Airports – Logan International Airport
Laurel Airport

Utilities

Natural Gas – MDU & MPC – offices and substations

Electric

Generating Facilities – MPC/PPL – Corrette Plant & Offices – Service Yards –
Transmission Lines

Yellowstone Valley Electric Cooperative– Huntley –office – substation – service yard

Telecommunications

Qwest

AT&T

Avista

Cellular One

Touch America

Verizon

3 Rivers Wireless

Nursing Homes and Assisted Living Facilities

Adult Home Care Services, 106 Erickson Court, Billings

Autumn Care Centers, 4739 Rimrock Road, Billings

Autumn Care Centers, 2233 Myrtle Drive, Billings

Azalea Place, 2924 Stillwater, Billings

Billings Health and Rehab. Community, 2115 Central, Billings

Butterfly Homes, 11 Lily Valley Circle, Billings

Canyon Ridge, 2115 Canyon Drive, Billings

Aspen Meadows, 3155 Avenue C, Billings

Diamond Willow Personal Care Home, 667 Black Diamond Road, Billings

Edgewood Vista, 1225 Wicks Lane, Billings

Evergreen Billings Health and Rehab Center, 1341 Rosebud Lane, Billings

Ginny Wanner's Assisted Living, 3842 Heritage Drive, Billings

Ginny Wanner's Assisted Living, 3320 Ravali Place, Billings

Grand Park, 1221 28th Street West, Billings

Heights Personal Care Home, 1139 Governors Blvd, Billings

HICO, 705 Lincoln Lane, Billings

Highgate Senior Living, 3980 Parkhill Drive, Billings

Lincoln Lane Assisted Living, 659 Lincoln Lane, Billings

Magnolia Place, 3201 Rugby Drive, Billings

Primrose Personal Care Home, 1228 Maurine, Billings

Rim Shadows Personal Care Home, 2138 Skyview Drive, Billings

Ridgeview Senior Living, 2024 Ridgeway Drive, Billings

St Johns Lutheran Home, 3940 Rimrock Road, Billings

Sunny View, 849 Avenue F, Billings

Tendernest, 4001 Parkhill Drive, Billings

Valley Health Care, 1807 24 West, Billings

Vista, 3840 Rimrock Road, Billings

Westpark Village, 2351 Solomon Avenue, Billings
Asplin Assisted Living, 44 W 4th Avenue North, Laurel
Evergreen Laurel Health, 820 3rd Ave., Laurel
Tendernest, 120 W 12th Street, Laurel
TLC Personal Care Home, 804 2nd Street W, Roundup
Whispering Pines, 40 Horsethief Creek Road, Roundup

Communications Facilities

City/County Dispatch Centers
Laurel Dispatch
BLM Interagency Dispatch Center
MHP Dispatch Center

Military Facilities

Army National Guard Armory
Army & Navy Reserve Centers

Industry

Conoco Refinery
Exxon Refinery
Cenex Refinery
Yellowstone, Glacier and Seminole Pipeline Companies
MT Sulfur & Chemical
Transbas, Inc.
Major electric transmission lines from Colstrip

Miscellaneous

Dams - Anita Dam – Agricultural - Huntley

Federal/State Government

FBI 2929 3rd Avenue North, Billings
Alternatives, Inc. 3109 1st Avenue North, Billings
Billings Logan Airport
Low Vision, Job Service, Child Support Enforcement, Community Services Bureau
Developmental Disabilities 2121 Rosebud Drive, Billings
Child and Family Services 301 West 1st, Billings
Health and Human Services 2525 4th Avenue North, Billings
Justice Bldg (Montana Highway Patrol) 615 South 27th Street, Billings
Dept. of Ag 321 South 24th Street West, Billings
Army National Guard 2915 Gabel Road, Billings
Bureau of Mines and Geology 1300 North 27th, Billings
Corrections Adult Probation and Parole 2615 4th Avenue South, Billings
Environmental Quality 1371 Rimtop Drive, Billings
Fish Wildlife and Parks 2300 Lake Elmo Drive, Billings
Livestock Commission N Frontage Road, Billings
Montana State University 1500 N 30th, Billings

Natural Resources and Conservation 2535 Saint Johns Ave, Billings
Water Resources, Airport Industrial Park, Billings
Dept Child and Family Services 2525 4rd Avenue North, Billings
Dept of Transportation 424 Morey Land, Billings
Veterans Affairs, 1234 Avenue C, Billings
Women's Correction Center, 701 South 27th, Billings
Naval Reserve Center North Park, Billings
James F. Battin Federal Building, 316 North 26th, Billings
Jamison Federal Building, 2900 4th Avenue North, Billings
Office of Public Assistance, 111 North 31st, Billings
Montana State University, 27th Street, Billings
Western Area Power Admin.
Bureau of Land Management, South Billings Blvd., Billings
Postal Service – stations throughout County
 Centennial, 2250 Grant Road, Billings
 Downtown, 2601 1st Avenue North, Billings
 Heights, 710 Wicks Lane, Billings
 Main Office, 841 South 26th Street, Billings
 Pioneer, 724 15th Street West, Billings
 Ballantine, 1605 Ash Street, Ballantine
 Broadview, 16713 Iowa Street, Broadview
 Custer, 413 Second Avenue, Custer
 Huntley, 155 Northern Avenue, Huntley
 Laurel, 614 First Avenue, Laurel
 Pompeys Pillar, 3519 Second Street S, Pompeys Pillar
 Shepherd, 5450 Carey Avenue, Shepherd
 Worden, 2427 Main Street, Worden
National Weather Service, Overland Road, Billings
MT DOT Maintenance Facility

County Government

Yellowstone County Courthouse 217 North 27th Street, Billings, MT 59101
Air Pollution, 3306 2nd Ave North, Billings
Big Sky EDA, 222 North 32nd Street, Billings
MetraPark, 308 6th Avenue North, Billings
City/County Health, 123 South 27th, Billings
Health Home and Community Services, 711 Central, Billings
Junk Vehicle Shop, 1200 Shiloh, Billings
Motor Vehicle Office, 115 West 1st, Laurel
Yellowstone County Museum, 1950 Terminal Circle, Billings, 59105
Planning, 510 North Broadway, Billings
Public Defenders, 207 North Broadway, Billings
Road and Bridge, 3321 King Ave E, Billings
Sheriff, 219 North 26th, Billings
Detention, 3165 King Avenue E, Billings
Weed Control, 3319 King Avenue E, Billings

Youth Services Center, 410 South 26th, Billings
Shop Complex – Road Department

City Government

Animal Shelter, 302 Edwards, Billings
Billings City Admin, 210 N 27th Street, Billings
Community Center, 360 North 23th, Billings
Fire Department, Dispatch, and EOC, 2305 8th Avenue North, Billings
 Fire Station #2, 501 South 28th
 Fire Station #3, 1928 17th Street West
 Fire Station #4, 475 6th Street West
 Fire Station #5, 605 South 24th Street West
 Fire Station #6, 1601 Saint Andrews
Solid Waste, South Billings Blvd, Billings
Landfill, 5240 Jellison Road, Billings
Billings Library, 510 North Broadway, Billings
Parking Garages 2912 3rd Avenue North, Billings
 2651 1st Avenue North, Billings
 210 North 27th, Billings
 515 N 31st, Billings
Public Utilities, 2251 Belknap Avenue, Billings
Wastewater Treatment Plant, Highway 87 South, Billings
Laurel Airport, Laurel Airport Road, Laurel
Laurel Library, 720 West 3rd, Laurel
Laurel Fire Department, 215 W 1st, Laurel
Laurel Police Department, 215 W 1st, Laurel
Laurel Water Plant, 802 Sewer Plant Road, Laurel
Laurel Sewer Plant, 1501 Sewer Plant Road, Laurel
Cobb Field, North 27th Street, Billings
Billings Police Dept, 220 North 27th, Billings
Park and Rec. Dept., 360 North 23rd, Billings
Billings City Shops, South Billings Blvd., Billings
Laurel Safety Complex
Laurel City Hall

D. Assessing Vulnerability: Estimating Potential Losses

1. Estimate of potential dollar losses to vulnerable structures

Yellowstone County used FEMA publication FEMA 386-2, "Understanding Your Risks, identifying hazards and estimating losses" to assist with the assessment each identified hazard. The publication goes step-by-step through the process to evaluate each hazard incident's potential losses to the community. Yellowstone County also used HAZUS data to work through this process.

2. Description of Methodology used to prepare estimate

The methodology used to prepare potential losses was to determine the total value of structures in Yellowstone County using HAZUS data. After determining total values for Yellowstone County, we then evaluated the percentage of the County a disaster would affect to determine potential loss. From these values we can estimate the amount of damage structures in the disaster area would receive to get actual losses. Example: Total County value \$100,000, 1% of County is affected by disaster = \$1,000 in disaster area, structures sustained 50% damage, total loss would be \$500. This method was determined to be the most accurate at this time, due to the fact, that the County does not currently have the software to run simulations through HAZUS. The County anticipates purchasing the required software within the next year and acquiring a computer powerful enough to handle the requirements of the programs.

YELLOWSTONE COUNTY

Hazard Area 100% of County

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in Community or State	# in Hazard Area	% in Hazard Area	\$ in Community or State	\$ in Hazard Area	% in Hazard Area	# in Community or State	# in Hazard Area	% in Hazard Area
Residential	61876	61876	100%	\$11,833,371,000.00	\$11,833,371,000.00	100%	129,352	129,352	100%
Commercial	565	565	100%	\$ 1,170,839,000.00	\$ 1,170,839,000.00	100%			100%
Industrial	21	21	100%	\$ 134,436,000.00	\$ 134,436,000.00	100%			100%
Agricultural	2	2	100%	\$ 16,990,000.00	\$ 16,990,000.00	100%			100%
Religious/Non-profit	13	13	100%	\$ 53,049,000.00	\$ 53,049,000.00	100%			100%
Government	19	19	100%	\$ 20,736,000.00	\$ 20,736,000.00	100%			100%
Education	2	2	100%	\$ 26,181,000.00	\$ 26,181,000.00	100%			100%
Utilities			100%			100%			100%
TOTAL	62498	62498		\$13,255,602,000.00	\$13,255,602,000.00		129,352	129,352	

Value of structures in hazard area + 108% of structure value (determines content value) = Total Loss

$$\$13,255,602,000.00 + (108\% \times \$13,255,602,000.00) = \$27,571,652,160.00$$

75% OF YELLOWSTONE COUNTY

Hazard Area 75% of County

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in Community or State	# in Hazard Area	% in Hazard Area	\$ in Community or State	\$ in Hazard Area	% in Hazard Area	# in Community or State	# in Hazard Area	% in Hazard Area
Residential	61876	46407	75%	\$ 11,833,371,000.00	\$ 8,875,028,250.00	75%	129,352	97014	75%
Commercial	565	424	75%	\$ 1,170,839,000.00	\$ 878,129,250.00	75%			75%
Industrial	21	16	75%	\$ 134,436,000.00	\$ 100,827,000.00	75%			75%
Agricultural	2	2	75%	\$ 16,990,000.00	\$ 12,742,500.00	75%			75%
Religious/Non-profit	13	10	75%	\$ 53,049,000.00	\$ 39,786,750.00	75%			75%
Government	19	14	75%	\$ 20,736,000.00	\$ 15,552,000.00	75%			75%
Education	2	2	75%	\$ 26,181,000.00	\$ 19,635,750.00	75%			75%
Utilities		0	75%		\$ -	75%			75%
TOTAL	62,498	46,874		\$ 13,255,602,000.00	\$ 9,941,701,500.00		129,352	97,014	

Value of structures in hazard area + 108% of structure value (determines content value) = Total Loss

$$\$9,941,701,500.00 + (108\% \times \$9,941,701,500.00) = \$20,678,739.120.00$$

60% OF YELLOWSTONE COUNTY

Hazard Area 60% of County

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in Community or State	# in Hazard Area	% in Hazard Area	\$ in Community or State	\$ in Hazard Area	% in Hazard Area	# in Community or State	# in Hazard Area	% in Hazard Area
Residential	61876	37126	60%	\$ 11,833,371,000.00	\$ 7,100,022,600.00	60%	129,352	77611	60%
Commercial	565	339	60%	\$ 1,170,839,000.00	\$ 702,503,400.00	60%			60%
Industrial	21	13	60%	\$ 134,436,000.00	\$ 80,661,600.00	60%			60%
Agricultural	2	1	60%	\$ 16,990,000.00	\$ 10,194,000.00	60%			60%
Religious/Non-profit	13	8	60%	\$ 53,049,000.00	\$ 31,829,400.00	60%			60%
Government	19	11	60%	\$ 20,736,000.00	\$ 12,441,600.00	60%			60%
Education	2	1	60%	\$ 26,181,000.00	\$ 15,708,600.00	60%			60%
Utilities		0	60%		\$ -	60%			60%
TOTAL	62,498	37,499		\$ 13,255,602,000.00	\$ 7,953,361,200.00		129,352	77,611	

Value of structures in hazard area + 108% of structure value (determines content value) = Total Loss

$$\$7,953,361,200.00 + (108\% \times \$7,953,361,200.00) = \$16,542,991,296.00$$

50% OF YELLOWSTONE COUNTY

Hazard Area 50% of County

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in Community or State	# in Hazard Area	% in Hazard Area	\$ in Community or State	\$ in Hazard Area	% in Hazard Area	# in Community or State	# in Hazard Area	% in Hazard Area
Residential	61876	30938	50%	\$ 11,833,371,000.00	\$ 5,916,685,500.00	50%	129,352	64,676	50%
Commercial	565	283	50%	\$ 1,170,839,000.00	\$ 585,419,500.00	50%			50%
Industrial	21	11	50%	\$ 134,436,000.00	\$ 67,218,000.00	50%			50%
Agricultural	2	1	50%	\$ 16,990,000.00	\$ 8,495,000.00	50%			50%
Religious/Non-profit	13	7	50%	\$ 53,049,000.00	\$ 26,524,500.00	50%			50%
Government	19	10	50%	\$ 20,736,000.00	\$ 10,368,000.00	50%			50%
Education	2	1	50%	\$ 26,181,000.00	\$ 13,090,500.00	50%			50%
Utilities			50%			50%			50%
TOTAL	62,498	31,249		\$ 13,255,602,000.00	\$ 6,627,801,000.00		129,352	64,676	

Value of structures in hazard area + 108% of structure value (determines content value) = Total Loss

$$\$6,627,801,000.00 + (108\% \times \$6,627,801,000.00) = \$13,785,826,080.00$$

25% OF YELLOWSTONE COUNTY

Hazard Area 25% of County

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in Community or State	# in Hazard Area	% in Hazard Area	\$ in Community or State	\$ in Hazard Area	% in Hazard Area	# in Community or State	# in Hazard Area	% in Hazard Area
Residential	61876	15469	25%	\$ 11,833,371,000.00	\$ 2,958,342,750.00	25%	129,352	32,338	25%
Commercial	565	141	25%	\$ 1,170,839,000.00	\$ 292,709,750.00	25%			25%
Industrial	21	5	25%	\$ 134,436,000.00	\$ 33,609,000.00	25%			25%
Agricultural	2	1	25%	\$ 16,990,000.00	\$ 4,247,500.00	25%			25%
Religious/Non-profit	13	3	25%	\$ 53,049,000.00	\$ 13,262,250.00	25%			25%
Government	19	5	25%	\$ 20,736,000.00	\$ 5,184,000.00	25%			25%
Education	2	1	25%	\$ 26,181,000.00	\$ 6,545,250.00	25%			25%
Utilities			25%			25%			25%
TOTAL	62,498	15,625		\$ 13,255,602,000.00	\$ 3,313,900,500.00		129,352	32,338	

Value of structures in hazard area + 108% of structure value (determines content value) = Total Loss

$$\$3,313,900,500.00 + (108\% \times \$3,313,900,500.00) = \$6,892,913,040.00$$

10% OF YELLOWSTONE COUNTY

Hazard Area 10% of County

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in Community or State	# in Hazard Area	% in Hazard Area	\$ in Community or State	\$ in Hazard Area	% in Hazard Area	# in Community or State	# in Hazard Area	% in Hazard Area
Residential	61876	6188	10%	\$ 11,833,371,000.00	\$ 1,183,337,100.00	10%	129,352	12,935	10%
Commercial	565	57	10%	\$ 1,170,839,000.00	\$ 117,083,900.00	10%			10%
Industrial	21	2	10%	\$ 134,436,000.00	\$ 13,443,600.00	10%			10%
Agricultural	2	0	10%	\$ 16,990,000.00	\$ 1,699,000.00	10%			10%
Religious/Non-profit	13	1	10%	\$ 53,049,000.00	\$ 5,304,900.00	10%			10%
Government	19	2	10%	\$ 20,736,000.00	\$ 2,073,600.00	10%			10%
Education	2	0	10%	\$ 26,181,000.00	\$ 2,618,100.00	10%			10%
Utilities			10%			10%			10%
TOTAL	62,498	6,250		\$ 13,255,602,000.00	\$ 1,325,560,200.00		129,352	12,935	

Value of structures in hazard area + 108% of structure value (determines content value) = Total Loss

$$\$1,325,560,200.00 + (108\% \times \$1,325,560,200.00) = \$2,757,216.00$$

5% OF YELLOWSTONE COUNTY

Hazard Area 5% of County

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in Community or State	# in Hazard Area	% in Hazard Area	\$ in Community or State	\$ in Hazard Area	% in Hazard Area	# in Community or State	# in Hazard Area	% in Hazard Area
Residential	61876	3094	5%	\$ 11,833,371,000.00	\$ 591,668,550.00	5%	129,352	6,468	5%
Commercial	565	28	5%	\$ 1,170,839,000.00	\$ 58,541,950.00	5%			5%
Industrial	21	1	5%	\$ 134,436,000.00	\$ 6,721,800.00	5%			5%
Agricultural	2	0	5%	\$ 16,990,000.00	\$ 849,500.00	5%			5%
Religious/Non-profit	13	1	5%	\$ 53,049,000.00	\$ 2,652,450.00	5%			5%
Government	19	1	5%	\$ 20,736,000.00	\$ 1,036,800.00	5%			5%
Education	2	0	5%	\$ 26,181,000.00	\$ 1,309,050.00	5%			5%
Utilities			5%		\$ -	5%			5%
TOTAL	62,498	3,125		\$ 13,255,602,000.00	\$ 662,780,100.00		129,352	6,468	

Value of structures in hazard area + 108% of structure value (determines content value) = Total Loss

$$\$662,780,100.00 + (108\% \times \$662,780,100.00) = \$1,378,582,608.00$$

1% OF YELLOWSTONE COUNTY

Hazard Area 1% of County

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in Community or State	# in Hazard Area	% in Hazard Area	\$ in Community or State	\$ in Hazard Area	% in Hazard Area	# in Community or State	# in Hazard Area	% in Hazard Area
Residential	61876	619	1%	\$ 11,833,371,000.00	\$ 118,333,710.00	1%	129,352	1,294	1%
Commercial	565	6	1%	\$ 1,170,839,000.00	\$ 11,708,390.00	1%			1%
Industrial	21	0	1%	\$ 134,436,000.00	\$ 1,344,360.00	1%			1%
Agricultural	2	0	1%	\$ 16,990,000.00	\$ 169,900.00	1%			1%
Religious/Non-profit	13	0	1%	\$ 53,049,000.00	\$ 530,490.00	1%			1%
Government	19	0	1%	\$ 20,736,000.00	\$ 207,360.00	1%			1%
Education	2	0	1%	\$ 26,181,000.00	\$ 261,810.00	1%			1%
Utilities			1%		\$ -	1%			1%
TOTAL	62,498	625		\$ 13,255,602,000.00	\$ 132,556,020.00		129,352	1,294	

Value of structures in hazard area + 108% of structure value (determines content value) = Total Loss

$$\$132,556,020.00 + (108\% \times \$132,556,020.00) = \$275,716,521.60$$

.1% OF YELLOWSTONE COUNTY

Hazard Area .1% of County

Type of Structure	Number of Structures			Value of Structures			Number of People		
	# in Community or State	# in Hazard Area	% in Hazard Area	\$ in Community or State	\$ in Hazard Area	% in Hazard Area	# in Community or State	# in Hazard Area	% in Hazard Area
Residential	61876	62	0.1%	\$ 11,833,371,000.00	\$ 11,833,371.00	0.1%	129,352	129	0.1%
Commercial	565	1	0.1%	\$ 1,170,839,000.00	\$ 1,170,839.00	0.1%			0.1%
Industrial	21	0	0.1%	\$ 134,436,000.00	\$ 134,436.00	0.1%			0.1%
Agricultural	2	0	0.1%	\$ 16,990,000.00	\$ 16,990.00	0.1%			0.1%
Religious/Non-profit	13	0	0.1%	\$ 53,049,000.00	\$ 53,049.00	0.1%			0.1%
Government	19	0	0.1%	\$ 20,736,000.00	\$ 20,736.00	0.1%			0.1%
Education	2	0	0.1%	\$ 26,181,000.00	\$ 26,181.00	0.1%			0.1%
Utilities			0.1%		\$ -	0.1%			0.1%
TOTAL	62,498	62		\$ 13,255,602,000.00	\$ 13,255,602.00		129,352	129	

Value of structures in hazard area + 108% of structure value (determines content value) = Total Loss

$$\$13,255,602.00 + (108\% \times \$13,255,602.00) = \$27,571,652.16$$

From these charts, we can then determine the percentage of damage expected to structures in the disaster area to get structure loss estimates.

Content values are determined by type of structure ranging from 50% of the structure cost to 150% of structure cost depending on the type of structure. Residential is 50%, where commercial structure content values are 150% of structure value. To determine the average, all content value percentages were determined and the average value for all types of structures is 108% of structure value. Example: (from above) \$500 loss would incur a 108% additional content loss of \$540 making total loss \$1,040. This does not take into account loss of life. The total then needs to be reduced by the percentage of damage sustained to structures in the disaster area. Total loss---100%, minimal loss---10%.

E. Assessing Vulnerability: Analyzing Development Trends

1. Description of land uses and development trends in the community

Yellowstone County development trends show a slow and steady growth. Being the largest city in the State of Montana, and the largest in the region, it continues to attract new residents. Job growth is expanding and current economic indicators indicate the trend will continue according to Dr. Scott Rickard, director of the Center for Applied Economic Research at Montana State University-Billings. The latest as listed in the Billings Gazette on Friday, February 13, 2004 show that Yellowstone County will grow 28.9% between 2002 and 2025. Meaning the population of Yellowstone County will be 170,520 by 2025. With the influx of people into Yellowstone County, it is anticipated that housing starts will continue to increase along with urban sprawl. While this will decrease the amount of farm/ranch land in use the County will still have two very diverse sections, urban and agricultural.

Billings and Laurel are seeing the largest increase in growth and sprawl in the County. Broadview and the outlying areas are seeing less expansion. Currently the most desirable areas for building are near the Yellowstone River and in the wildland urban interface. These areas of concern are being addressed through floodplain mapping and regulations, and fuel hazard mapping. Yellowstone County will be developing mitigation projects and public awareness campaigns in areas identified as high risk in the fuel hazard mapping. Permits for building structures in designated floodplain areas will not be issued.

The cities of Billings and Laurel are in close proximity of each other and face many of the same hazards. As noted in the hazard identification section, both natural and manmade hazards are a potential in these areas and historical data shows they have occurred, while those hazards related to more rural areas are not.

Broadview, while incorporated is still a more rural area of the County. The natural hazards are more applicable to this area than the manmade hazards. Although being in close proximity to the interstate does create a risk with transportation and hazardous materials incidents, civil unrest and enemy attack is less likely to be a factor.

F. Capability Assessment

1. Existing Mitigation Plans, Programs, and Structures

Yellowstone County combines plans, programs and procedures developed through many different resources to form the most comprehensive plan possible. Local and State government have adopted plans, programs, and procedures to provide levels of protection to community members. These plans range from operations plans to regulations and permitting systems.

a. Local Government

Yellowstone County and city government have adopted several plans, programs, and structures related to advanced planning.

These include:

- * Emergency Operations Plan for Billings, Laurel, Broadview, and Yellowstone County
- * Glacier Lake Dams Emergency Action Plan
- * Cooney Dam Emergency Action Plan
- * Pre-Flood Hazard Mitigation Plan for the Cities of Laurel, Billings, and Yellowstone County Montana
- * Flood Hazard Mitigation Plan for City of Laurel Montana
- * Anita Dam Emergency Preparedness Brief with Inundation Map from standing operating procedures

b. State Government

The State of Montana has adopted several plans, programs, and structures related to advanced planning.

These include:

- * Montana Subdivision and Platting Act
- * Montana Building Codes
- * Montana Sanitation in Subdivision policies
- * Montana Pre-Disaster Mitigation Plan
- * Montana Strategic Plan

IV. Mitigation Strategy

The mitigation strategy is the course of action Yellowstone County and the incorporated communities of Billings, Broadview and Laurel plan on taking to prevent losses from disasters in the future. Rather than wait until a disaster occurs, these communities have developed this strategy to move in a proactive direction in disaster prevention. Losses cannot be fully mitigated, but actions can be taken as funding and opportunities become available to reduce the impacts of disasters which will save taxpayer dollars. Yellowstone County's established Local Emergency Planning Committee along with concerned citizens have participated in developing the mitigation strategy. Public meetings helped address areas of greatest concern. Action items were identified and prioritized by the greatest benefit to the community and the best use of time and funding.

Natural Hazard Priority Ranking for Yellowstone County (from page 28)			
Hazard	Probability of Disastrous Event (chance in any given year)	Magnitude (severity/impact to community)	Priority Rank
Flooding	Moderate	High	1
Wildfire	Moderate-High	Moderate	2
Wind and Hail Storms	Moderate	Moderate-High	3
Tornado	Moderate-High	Moderate	4
Winter Storms	High	Moderate-High	5
Drought	Moderate-High	Moderate-High	6
Insect Infestations	Moderate	Moderate-High	7
Urban Fire	Moderate	Moderate	8
Dam Failure	Low-Moderate	Low-Moderate	9
Expansive Soil	Moderate	Moderate	10
Landslides	Low-Moderate	Moderate-High	11
Earthquake	Low	Low	12
Volcanic Ash	Low	Low	13

Manmade Hazard Priority Ranking for Yellowstone County (from page 28)			
Hazard	Probability of Disastrous Event (chance in any given year)	Magnitude (severity/impact to community)	Priority Rank
Transportation/Mobile Incident	Moderate	High	1
Hazardous Materials Incident/Accident-Fixed	Moderate-High	Moderate	2
Terrorism/Bio-Terrorism	Low-Moderate	Moderate-High	3
Civil Disturbance/Riot/Labor Unrest	Moderate	Moderate	4
Enemy Attack	Low	Low-Moderate	5

Natural Hazard Vulnerability Ranking for Yellowstone County					
Hazard	History	Vulnerability	Maximum Threat	Probability	Rank
Flooding	High	High	High	High	1
Wildfire	High	High	High	High	2
Wind and Hail Storms	High	High	High	High	3
Tornado	Moderate	Moderate	Moderate	Moderate	4
Winter Storms	High	Moderate	Moderate	Moderate	5
Drought	High	Low	Moderate	Moderate	6
Insect Infestations	Moderate	Moderate	Moderate	Moderate	7
Urban Fire	Low	Low	Moderate	Low	8
Dam Failure	Low	Moderate	Moderate	Low	9
Expansive Soil	Moderate	Low	Low	Moderate	10
Landslides	Moderate	Low	Low	Low	11
Earthquake	Low	Low	Low	Low	12
Volcanic Ash	Low	Low	Low	Low	13

Manmade Hazard Vulnerability Ranking for Yellowstone County					
Hazard	History	Vulnerability	Maximum Threat	Probability	Rank
Transportation/Mobile Incident	Moderate	Moderate	High	High	1
Hazardous Materials Incident/Accident-Fixed	Moderate	Moderate	High	High	2
Terrorism/Bio-Terrorism	Low	Moderate	High	Low	3
Civil Disturbance/Riot/Labor Unrest	Moderate	Moderate	Moderate	Moderate	4
Enemy Attack	Low	Moderate	High	Low	5

A. Local Hazard Mitigation Goals

Plan goals identify how local agencies and concerned citizens can take action to mitigate the risk from natural and manmade disasters. Goals and objectives were identified through the planning and development process and by looking at specific projects that were referenced frequently.

Goal 1: Increase Hazard Awareness

Objective 1.1: Communicate with public about area hazards.

Objective 1.2: Demonstration mitigation projects.

Objective 1.3: Public Education.

Goal 2: Reduce Impacts of Flooding

Objective 2.1: Prevent losses to Yellowstone County infrastructure from flooding.
Install culverts in areas where water runoff is insufficient.
Increase stormwater systems in poor drainage areas.

Objective 2.2: Reduce individual losses from flooding.
Educate the public on flood insurance
Educate builders on building specifications and floodplain building requirements

Goal 3: Reduce the impact of wildfires and structure fires on the community.

Objective 3.1: Education
Promote wise building practices

Objective 3.2: Protect homes in the wildland-urban interface from wildfires.
Expand existing hazard fuels reduction programs in wildland-urban interface areas.

Objective 3.3: Coordinate fire department prevention activities.
Support the Firewise Committee programs in planning, training, prevention, and suppression.

Objective 3.4: Prevent large commercial structure fires.
Promote sprinkler system installation in older commercial structures.

Goal 4: Improve Emergency Communications

Objective 4.1: Expand and Upgrade Public Alerting System

Objective 4.2: Maintain the current function and capability of the Alerting System.

Objective 4.3: Expand the Alerting System into areas of new development.

Objective 4.4: Seek new ways to better communicate with the public about disaster events.

Goal 5: Countywide Mapping and Zoning

Objective 5.1: Map areas of County where growth is imminent and has a high hazard potential.

Objective 5.2: Create regulations that limit development in areas with high hazard potential.

Objective 5.3: Create an awareness of current regulations

Goal 6: Protection of public health and property from disasters

Objective 6.1: Public Education.

Objective 6.2: Special Populations Identification

Objective 6.3: Promote Safety Measures

Goal 7: Grow and Develop Partnerships

Objective 7.1: Build a greater connection between County agencies

Objective 7.2: Build better partnerships with first responders

Objective 7.3: Create new partnerships between first responders, business, and individuals in the community.

Goal 8: Enhance Emergency Services

Objective 8.1: Continue to improve first responder equipment throughout County

Objective 8.2: Seek innovative way to improve services.

Objective 8.3: Collaboration between agencies.

B. Identification and Analysis of Mitigation Measures

Proposed projects to mitigate hazards in Yellowstone County are quite diverse. At the preliminary public meetings and at committee meetings areas of concern were identified and ranked according to which were the most urgent mitigation concerns for Yellowstone County. These projects all fit with the overall goals of the Yellowstone County PDM Plan.

Projects and Priority						
Goal 1: Increase Hazard Awareness						
<i>Project</i>	<i>Cost</i>	<i>Feasibility</i>	<i>Population Benefit</i>	<i>Property Benefit</i>	<i>Community Priorities</i>	<i>Jurisdiction</i>
Floodplain Awareness	Low	High	Moderate	Moderate	High	All
Firewise	Low	High	Moderate	Moderate	High	All
High Winds Awareness	Low	High	Moderate	Low	High	All
Weather Awareness	Low	High	Moderate	Low	High	All
Goal 2: Reduce Impacts of Flooding						
<i>Project</i>	<i>Cost</i>	<i>Feasibility</i>	<i>Population Benefit</i>	<i>Property Benefit</i>	<i>Community Priorities</i>	<i>Ranking</i>
Highway 3 Storm water Runoff Management	Moderate	High	Moderate	Low	High	County
Highway 87/Alkali Creek Crossing Improvement	Moderate	High	Moderate	Low	High	County
Storm Drain-Laurel, refer to mitigation plan January 22, 2002	Moderate	High	Moderate	Moderate	High	Laurel
Rimrock Road/Molt Road Flooding	Moderate	High	Moderate	Moderate	High	County
Billings West End Retention Pond/Diversion Channel	Moderate	High	Moderate	Moderate	High	Billings & County
Feasibility Study for irrigation canal unloading structures/linear parks	High	Moderate	Low	Low	Medium	County
Repetitive Loss Structure Buyout	High	Low	Low	Low	Medium	County
Stream Restoration	High	Low	Low	Low	Medium	County
Echo Canyon/Zephyr Lane Flooding	High	Low	Low	Moderate	Low	County

Projects and Priority

Goal 3: Reduce the impact of wildfires and structure fires on the community.						
<i>Project</i>	<i>Cost</i>	<i>Feasibility</i>	<i>Population Benefit</i>	<i>Property Benefit</i>	<i>Community Priorities</i>	<i>Ranking</i>
Rural Dry Hydrants	Moderate	High	Moderate	Moderate	High	County
Wildland Fire Mapping	High	High	Moderate	Moderate	High	County
Firewise Demonstration Houses	Moderate	High	Moderate	High	High	All
Older Building Sprinkler Installations	Moderate	Moderate	Moderate	High	Medium	All
Wise Building Practices	Low	Moderate	Moderate	High	Medium	All
Goal 4: Improve Emergency Communications						
<i>Project</i>	<i>Cost</i>	<i>Feasibility</i>	<i>Population Benefit</i>	<i>Property Benefit</i>	<i>Community Priorities</i>	<i>Ranking</i>
Public Alerting System Maintenance & Upgrade	High	High	High	Low	High	All
Rural Communication Systems	Moderate	Moderate	Moderate	Low	High	County
Alerting System Expansion	High	Moderate	High	Low	Medium	All

Projects and Priority						
Goal 5: Countywide Mapping and Zoning						
<i>Project</i>	<i>Cost</i>	<i>Feasibility</i>	<i>Population Benefit</i>	<i>Property Benefit</i>	<i>Community Priorities</i>	<i>Ranking</i>
Resolution of Clarks Camp problem	High	High	High	Moderate	High	County
Floodplain Mapping	High	High	Moderate	Moderate	High	County
New Floodplain Regulations	Moderate	High	Moderate	Moderate	High	All
Goal 6: Protection of public health and property from disasters						
<i>Project</i>	<i>Cost</i>	<i>Feasibility</i>	<i>Population Benefit</i>	<i>Property Benefit</i>	<i>Community Priorities</i>	<i>Ranking</i>
Enemy Attack/Terrorism plan update	Low	High	High	Low	High	All
12-Mile Creek-Dam Failure on Box Spring Road	High	Moderate	Moderate	Moderate	High	County
Special Population Emergency Planning	Moderate	Moderate	Moderate	Low	Medium	All
Subdivision Disaster Planning	Moderate	Low	Low	Low	Low	All
Animals in Disaster	Moderate	Low	Low	Low	Low	All
Safety Window Film Installation	Moderate	Low	Low	Low	Low	All

Projects and Priority						
Goal 7: Grow and Develop Partnerships						
<i>Project</i>	<i>Cost</i>	<i>Feasibility</i>	<i>Population Benefit</i>	<i>Property Benefit</i>	<i>Community Priorities</i>	<i>Ranking</i>
School Safety Education	Low	Moderate	Moderate	Low	Medium	All
School Violence Prevention	Low	Moderate	Moderate	Low	Medium	All
Wise Building Practices	Low	Moderate	Moderate	High	Medium	All
Countywide Building District	Moderate	Moderate	Moderate	High	Medium	County
Goal 8: Enhance Emergency Services						
<i>Project</i>	<i>Cost</i>	<i>Feasibility</i>	<i>Population Benefit</i>	<i>Property Benefit</i>	<i>Community Priorities</i>	<i>Ranking</i>
Hazard Identification/Comprehensive Planning/GIS	High	Moderate	Moderate	Moderate	Medium	County
Emergency Shelters	Moderate	Moderate	High	Low	Medium	All

C. Implementation of Mitigation Measures

Yellowstone County will implement the above mitigation actions by creating partnerships with local government, businesses, and individuals. Mitigation projects will be selected based on those that ranked highest in priority, ones that have the greatest public support. In addition, priority will be given to projects where funding is available. As funding or opportunities to initiate these projects come up, the higher priority activities can be prioritized even further with more detailed costs, benefits, and other criteria. Project funding will include state and federal grant programs and local funding. The LEPC has the capacity to organize resources, prepare grant applications, and oversee project implementation, monitoring and evaluation. Coordinating organizations may include local, county, or regional agencies that are capable of or responsible for implementing activities and programs. The DES Director will be responsible for mitigation project administration.

Yellowstone County, the cities of Billings and Laurel and the Town of Broadview work together, however, some activities are targeted to one jurisdiction as noted in the right hand columns above.

V. Plan Maintenance Procedures

The plan maintenance section of this document details the formal process that will ensure that the Yellowstone County Pre-Disaster Mitigation Plan remains an active and relevant document. The plan maintenance process includes a schedule for monitoring and evaluating the Plan and producing a revised plan every year and in accordance with the Disaster Mitigation Act of 2000. Additionally, if a disaster occurs, or substantial changes occur within the County, the plan will be reviewed and revised if necessary. This section describes how the county will integrate public participation throughout the plan maintenance process. Finally, this section includes an explanation of how Yellowstone County government intends to incorporate the mitigation strategies outlined in this Plan into existing planning mechanisms such as the County Comprehensive Land Use Plan, Capital Improvement Plans, and Building Codes.

A. Monitoring, Evaluating and Updating the Plan

The Yellowstone County Pre-Disaster Mitigation Plan will be evaluated on a yearly basis to determine the effectiveness of programs, and to reflect changes in land development or programs that may affect mitigation priorities. The evaluation process will be done yearly in conjunction with an LEPC meeting. Participants from all jurisdictions, local agencies, and the public will participate in plan evaluation and update. The convener or designee will be responsible for contacting the Pre-Disaster Mitigation Plan Committee members and organizing the public meeting. Committee members will be responsible for monitoring and evaluating the progress of the mitigation strategies in the Plan.

B. Implementation through existing programs

Yellowstone County addresses statewide planning goals and legislative requirements through its Comprehensive Land Use Plan, Capital Improvement Plans, and Montana State Building Codes. The Pre-Disaster Mitigation Plan provides a series of recommendations that are closely related to the goals and objectives of these existing planning programs. Yellowstone County will have the opportunity to implement recommended mitigation action items through existing programs and procedures.

Upon adoption of the Pre-Disaster Mitigation Plan, Yellowstone County will assist local municipalities in developing their natural hazard mitigation goals and actions by providing the Yellowstone County Pre-Disaster Mitigation Plan as a baseline of information on the hazards that impact the County.

Within six-months of formal adoption of the Pre-Disaster Mitigation Plan, the recommendations listed above will be incorporated into the process of existing planning mechanisms at the county level. The meetings of the Pre-Disaster Mitigation Plan Committee will provide an opportunity for committee members to report back on the progress made on the integration of mitigation planning elements into the county planning documents and procedures.

C. Continued Public Involvement

Yellowstone County, Billings, Laurel, and Broadview are dedicated to involving the public directly in the review and updates of the Pre-Disaster Mitigation Plan. The PDM Committee of the Local Emergency Planning Committee and the Disaster and Emergency Services office are responsible for reviewing and updating the plan every year or sooner if necessary.

The public will also have the opportunity to provide feedback about the Plan. Notices will be posted in the Billings Gazette and press releases will be sent to the local media. Copies of the Plan will be catalogued and kept at the Yellowstone County DES office and Clerk and Records office, and the Billings Public Library. The plan also includes the address and the phone number of the County Disaster and Emergency Services office responsible for keeping track of public comments on the Plan. In addition, copies of the plan and any proposed changes will be posted on the Yellowstone County website. This site will also contain an email address and phone number to which people can direct their comments and concerns.

A public meeting will also be held in conjunction with the evaluation and revision or when deemed necessary by the PDM Committee. The meetings will provide the public a forum for which they can express concerns, opinions, or ideas about the Plan. The DES Director will be responsible for using county resources to publicize the meetings and maintain public involvement through the County website, newspapers, and other media.